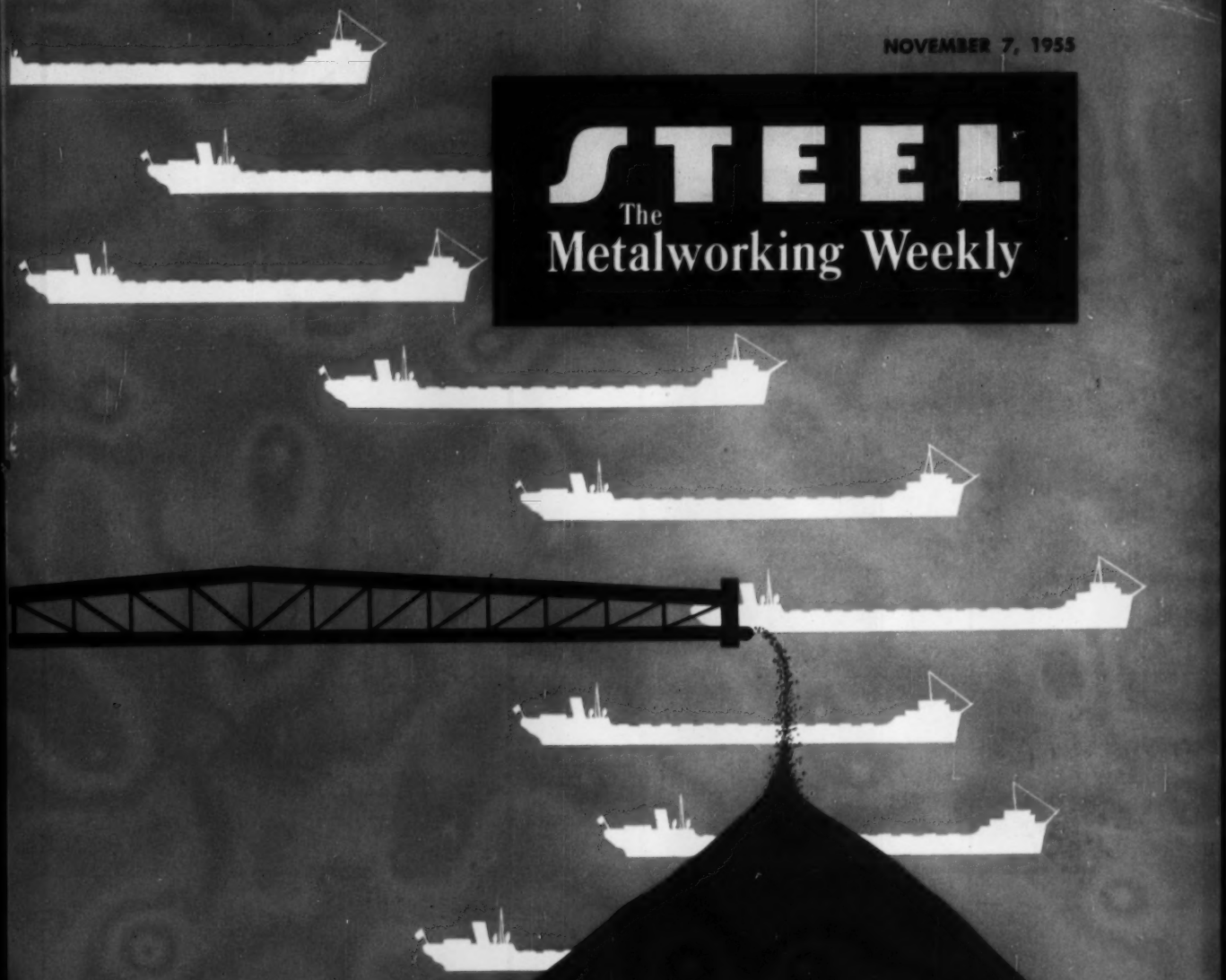
NOVEMBER 7, 1955

STEEL

The Metalworking Weekly



IRON ORE:

Enough for Steel's Big Expansion?

✓ Metal Users Outrun Supplies —page 99

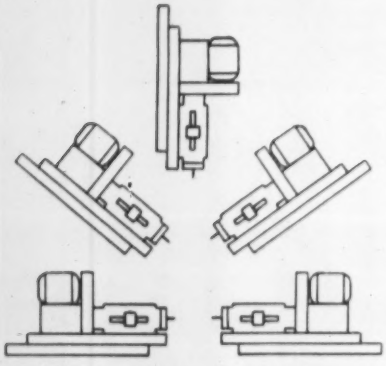
✓ High Nitrogen Steels: New Stainless Family —page 138

A NEW HIGH IN PRODUCTION EFFICIENCY

new

HEALD SLIDE UNIT BORE-MATICS

approach any borizing problem from the **RIGHT ANGLE**



Slide Units can be easily arranged to approach the work from any desired angle. Multiple stations can be combined on a single base with identical or consecutive operations at each station, for maximum production efficiency.

With the new line of Heald Slide Unit Bore-Matics, the machine can be adapted to the work—not the work to the machine. For these compact, hydraulically operated Slide Units, complete with boringhead and drive, can be arranged to approach the work from any desired angle—vertically, horizontally, or at any inclination best suited to the operations being performed and the nature of the work. That means greater adaptability to your specific job requirements. It means more efficient floor-to-floor cycles and higher production per machine-hour.

The two-station Vertical shown above is a typical example of modern Slide Unit design—boring, facing and chamfering aluminum torque converter housings at 88 parts per hour, gross. For the newest developments in precision finishing, IT PAYS TO COME TO HEALD.

THE HEALD MACHINE COMPANY

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HEALD

Send for Bulletin 2-25-S

Hay baler by New Holland Machine Co., New Holland, Pa.

Now the haystack is as hard to find as the needle

No more do you find huge dome-shaped stacks dotting the hay-fields of the countryside. Instead, tight and easy-to-handle bales are neatly formed and tied by efficient hay balers such as this one.

Hay balers, like other labor-saving agricultural machinery, have enormously increased in number in the decade since World War II. And because steel sheets are vital in the making of this type of heavy equipment, farm machinery has taken a rapidly swelling share of Bethlehem's hot- and cold-rolled sheet output.

Agriculture, in turn, is just one of many lines which have grown into big consumers of Bethlehem sheets in the past few years. Add them all up, together with continuing requirements of longer-established sheet users, and it's easy to see why Bethlehem is being called on to manufacture sheets in larger volume than ever before. We are making every effort to catch up to the unprecedented demand.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM SHEETS

BETHLEHEM STEEL

Here is maximum safety from hydraulic fires!

Pydraul F-9 hydraulic fluid was poured onto molten metal.

But even at 1200° F. Pydraul didn't burn.

That's because the Pydrauls are fire-resistant *chemicals.* They have all the lubricity of premium petroleum oil without the fire hazard, plus being noncorrosive, chemically stable, nontoxic, and reclaimable.

Whatever the temperature conditions and viscosity requirements of your hydraulic equipment, one of the specially tailored Pydrauls will keep it operating smoothly and efficiently with all the SAFETY possible.

Can you honestly afford *not* to use it?

Use Pydraul F-9, Pydraul 150, or Pydraul 600 in your hydraulic equipment. For FREE copy of informative "Pydraul F-9" booklet, or data on Pydraul 150 and Pydraul 600, write: Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Box 478-1-8, St. Louis 1, Mo.

LISTED UNDER REEXAMINATION SERVICE UL UNDERWRITERS' LABORATORIES, INC.

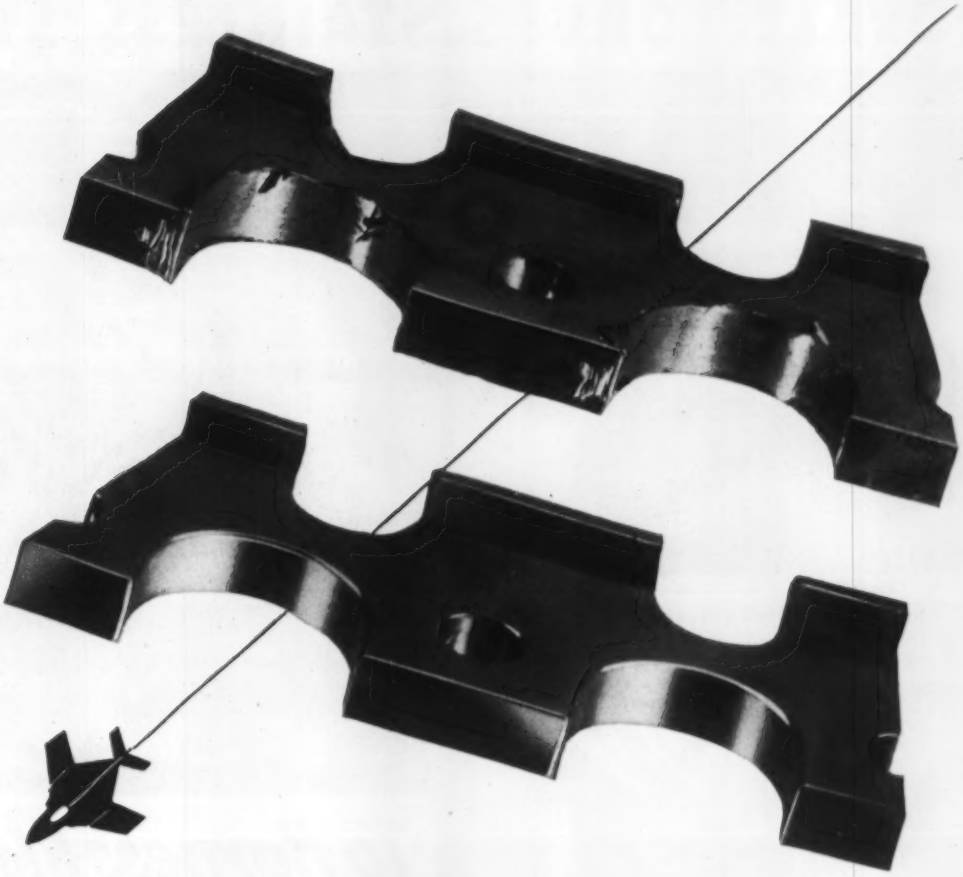
PYDRAUL F-9—FIRST AND ONLY HYDRAULIC FLUID LISTED BY UNDERWRITERS' LAB

On May 31, 1955, Pydraul F-9 became the first fire-resistant hydraulic fluid listed by Underwriters' Laboratories. From the Laboratories' Service Card: "The fire hazard of (Pydraul) is rated 2 to 3 in accordance with Underwriters' Laboratories, Inc.'s Standard of Classification in which Ether rates 100, Gasoline rates 90-100, Alcohol(ethyl) rates 60-70, Kerosene (100°F. flash) rates 30-40 and Paraffin oil rates 10-20." See Underwriters' Laboratories, Inc.'s guide no. 540 18, File MH6049.

Pydraul: Reg. U.S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

WHERE CREATIVE CHEMISTRY WORKS WONDERS FOR YOU

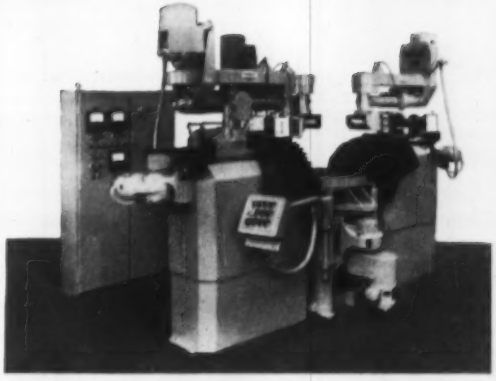


New standard in finishing

EXTREME temperatures and stresses set up in jet engines cause unprecedented strains on metal components.

Fatigue and failure producing concentrations of stress in a ring component—sections shown above—are eliminated by blending surface junctures with Osborn Brushamatic power brushing. Replacing undependable hand methods, power brushing produces the highest quality finish ever achieved. It speeds up production and inspection . . . eliminates rework.

It will pay *you* to have an **O**sborn **B**rushing **A**nalysis made of your finishing operations. Write *The Osborn Manufacturing Company, Dept. G-38, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



Osborn's 51-3L Brushamatic cleans and finishes metallic and non-metallic parts up to 8 feet in diameter, 3500 pounds in weight

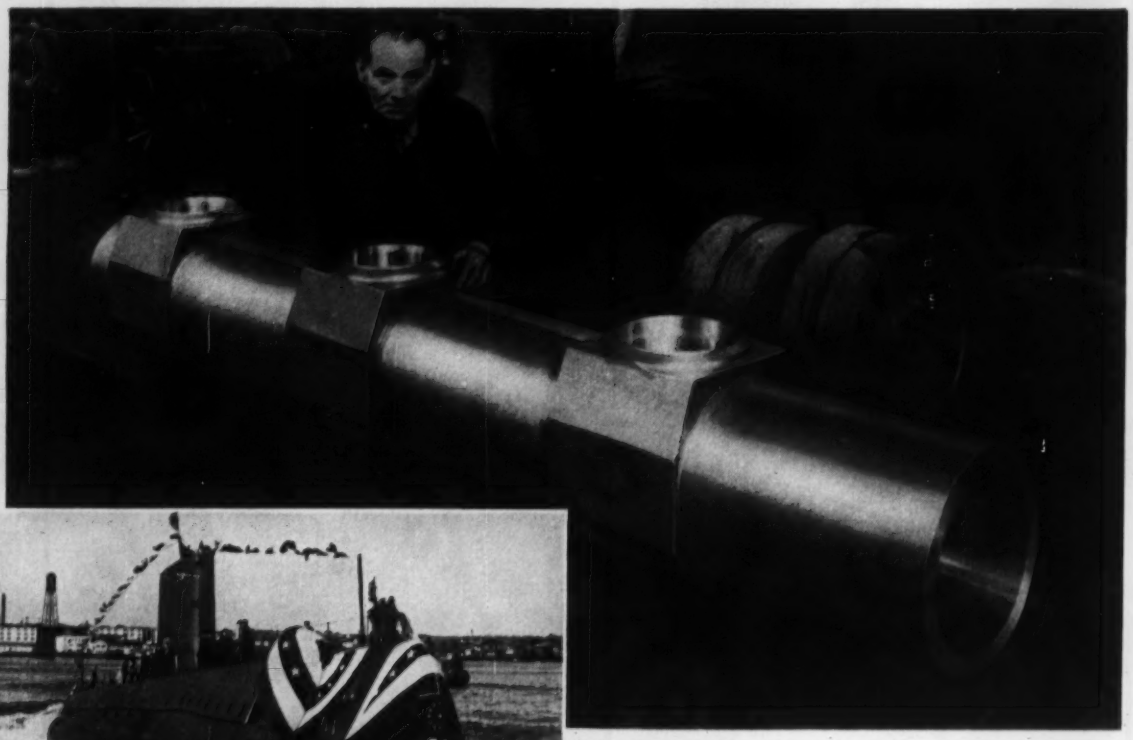
COMPLETE DATA—For information on power brushes and brushing methods write today for Osborn's Catalog 300.

Osborn Brushes

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

MIDVALE FORGES STAINLESS STEEL



Official U.S. Navy Photograph

To Harness Atomic Power Underseas

In planning atomic-powered submarines, top-grade materials and top-quality workmanship were first considerations throughout.

Midvale is proud to have supplied the stainless steel forgings used in the heat exchanger system of the power reactor . . . proud because of the recognition thus given to Midvale quality . . . in steel making, in forging, and subsequent heat treatment, inspection and testing.

These forgings of type 347 stainless steel required the most careful control in the melting and casting of the ingots, together with the best in forging technique to produce material that would pass all of the exacting metallurgical requirements. The 100% Zyglo inspection, inside and out, was only part of the specifications. All forgings were fabricated by welding into the piping system and heat exchanger.

It will pay you, too, to call Midvale for any forging . . . carbon, alloy or stainless steel . . . any shape — rolls, gear rings, shafts, pressure vessels or a variety of other steel products.

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FORGINGS, ROLLS, RINGS, FLANGES, CORROSION AND HEAT RESISTING CASTINGS

STEEL
The Metalworking Weekly

NOVEMBER 7, 1955
Vol. 137 No. 19

METALWORKING OUTLOOK, 81

The Editor's Views, 85

Iron Ore Reserves Will Outlast Us, 87
Lake Superior area will continue as prime source

Management at Work, 97
J. A. Ward: Shells are his specialty

Metal Users Outrun Supplies, 99
Steel, copper and aluminum get tighter, STEEL's survey shows

Lake Superior Ore Shipments Rise, 90

Steel Companies Announce Expansions, 91

Drop Forging Association Stages Fall Meet, 92

Standard Steel Looks for New Markets, 93

Compressed Air Tool Sales Push Ahead, 98

Windows of Washington, 94
Mirrors of Motordom, 101
The Business Trend, 105
Men of Industry, 109
New Products, 167
Behind the Scenes, 6
Letters to the Editors, 10
Calendar of Meetings, 27
New Literature, 179

TECHNICAL OUTLOOK, 129

Quality Control: Everybody in the Act, 130
Better product effort sweeps a company

Three Ways To Plate a Bumper, 132
Oldsmobile adds heat treatment as final touch

The New Materials Market, 158
Atoms mean millions to business

Heat Treating Gray Iron, Part III, 134

High-Nitrogen Steels: New Stainless Family, 138

Broaching Helical Gears, 147

Precision Crane Handling Speeds Press Building, 151

MARKET OUTLOOK, 183

Steel Operations, 183
Price Comparisons, 184
Nonferrous Roundup, 186
Nonferrous Prices, 188
Steel Prices, begin 190
Scrap Prices, 208

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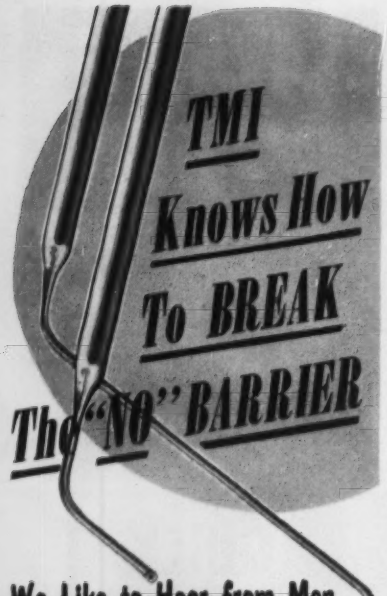

We Like to Hear from Men Who Dare to Ask the Impossible Of Small Diameter Stainless Steel and Alloy Tubing... And Expect to Get It!

✓ "No" is as little a part of their vocabulary as it is ours. Breaking the "no" barrier with a confident "yes" is common practice at TMI ... it's the reason our list of customers reads like a Who's Who in American manufacturing.

✓ If you have a challenge for precision, close tolerance Tru-Round tubing ... straightness, finish, resistance, strength or shape ... TMI should prove a dependable source of material, and satisfaction.

✓ We take the time to solve tubing problems—it's good business for us —good news for you.

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METALLURGISTS • ENGINEERS • MANUFACTURERS

BRIDGEPORT (Montgomery County), PA.

behind the scenes

Speech Available

On Oct. 11 Assistant Managing Editor Vance Bell addressed the Detroit district section of the Association of Iron & Steel Engineers. His subject: "The Forward Look in the Steel Industry." Interested persons have been quoting from it ever since, including such distinguished spokesmen as Donald C. Potts, president of the Pittsburgh Steamship Division of the U. S. Steel Corp. and John H. Byrne, executive director of the Lake Erie Watershed Conservation Foundation.

Vance assembled his speech from findings he had used for a steel expansion story (STEEL, Sept. 5, p. 41). We happen to know that he is willing to deliver this speech before any qualified and interested group. We suggest that if you wish to book him, send in your request now to Shrdlu, 419 Penton Bldg., Cleveland 13, O.

Editors Hit Platform

Many of STEEL's editors go barging about the country making speeches; this proves they can think as well on their feet as they can—er—well, any other way. Copy Editor Harry Chandler was in Washington last week solemnly instructing business paper editors in the art of preparing stylebooks. Standing lightly on his large, flat feet, he breathed life into hyphens, and made the role of rules so exciting and pulsating his hearers could scarcely refrain from leaping to their feet and cheering.

Market Editor Bill Rooney, too, makes his way to the platform. On Nov. 29 he will address the 1955 Institute for Small Manufacturers at the University of Pittsburgh.

Managing Editor Walt Campbell, of course, is an old hand at spellbinding. One week he was a speaker at an American Iron & Steel Institute meeting at Pittsburgh; six days later he made his seventh annual appearance before the Cleveland Advertising Club.

As in the case of Vance Bell, STEEL's professionals may be scheduled by special arrangement to appear before qualified groups of STEEL readers. Ol' Shrdlu is available, too, but because his only speech is a chalk talk on the crossfertilization of the dandelion and blackeyed peas, the metalworking crowd just can't work up any enthusiasm for him.

Le Chivalry Est Mort

The Farm Quarterly (F. & W. Publishing Co., Cincinnati) carried an article in its spring issue that gave us furiously to think. It was Editor R. J. McGinnis' development of a subject called "The Farmer Takes a Wife." He took the position that a farmer should select a wife with the same care he exercises when buying a cow. "The farmer," wrote Mr. McGinnis, "should appraise his prospective wife with all his wits about him, and leave love to the idle rich and the sentimentalist."

Sitting calmly (possibly in a fortified bunker), he established farm wives in two categories: Type I and Type II. "Type I should be sound of wind and limb; should be farm reared, not overly fastidious, not too educated. Type II is a decoration, and sometimes a luxury. Intelligent, college educated, she wants a dishwater, a garbage disposal and a glass oven."

WOW, Mr. McGinnis!

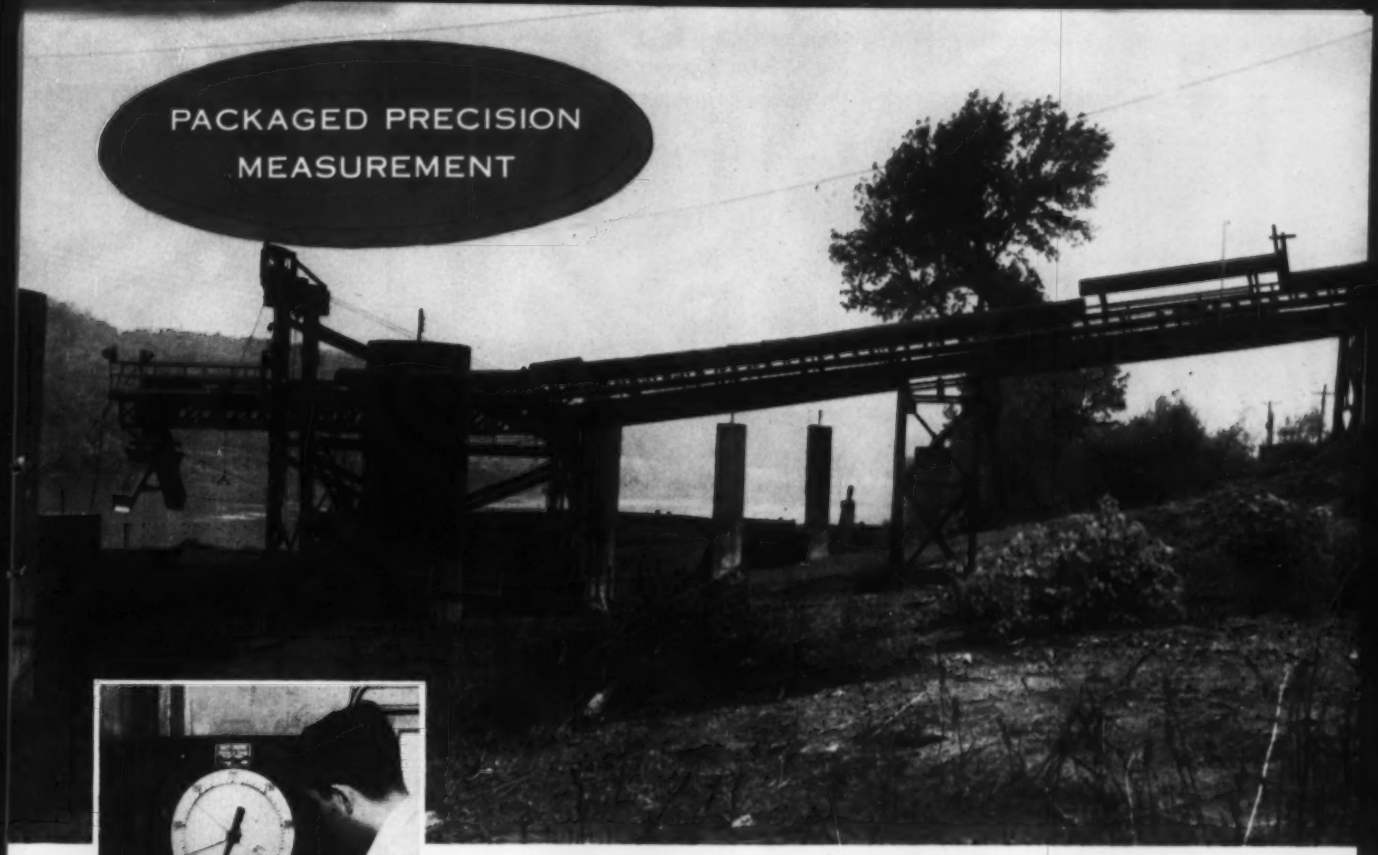
Boy, Fetch Blackstone

Here's a little law. The U. S. Supreme Court vacated, as improvidently granted, a writ of certiorari which it had previously issued to review an order of the Court of Appeals of the District of Columbia denying a motion to vacate a stay, pending appeal to that court, of an order of the District Court of the District of Columbia enjoining the comptroller general of the U. S. from refusing to audit a claim of the Blitz Tin Corp. against the U. S.

Was the Blitz Corp. pleased? What was the next step in the litigation?

Shrdlu

(Metalworking Outlook—Page 81)



Baldwin SR-4® Load Cell simplifies materials weighing at The Valley Camp Coal Company

Continuous electrical weighing of coal moving on a conveyor belt to river barges has simplified measurements of coal shipments and mine production at The Valley Camp Coal Company, Moundsville, W. Va. Furthermore, this new system gives greater assurance of bills of lading than those determined by water displacement of barges.

Heart of this weighing system, designed by Trans-Weigh Co., Wayne, Pa., is a 300-lb. Baldwin SR-4 Load Cell. Installed under the conveyor belt, this cell takes tensional loads and transmits weight signals electrically to a recording instrument in a distant mine office. Here the recorder shows instantaneous rates of flow of coal on the belt in tons per hour, a continuous circular chart record of flow rates and the total tonnage of coal carried on the belt to barges. Another totalizing counter at an operator's position on the dock adds to the convenience of the system. Accuracy of this system has proved to be within 1%.

Valley Camp also uses their weighing system to check estimated tonnages coming out of the mine in mine cars and to make more accurate daily reports of coal handled.

You too will benefit by using Baldwin *Packaged Precision Measurement*. Highly accurate SR-4 Devices are ruggedly built to take severe impacts and overloads. There are no moving parts to wear out. They're sealed against dust, dirt and moisture. Send today for our new booklets detailing uses of SR-4 Device systems to measure electronically either load, torque or fluid pressure.

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- ☐ Bulletin 4301 (SR-4 Load Cells & Load Beams)
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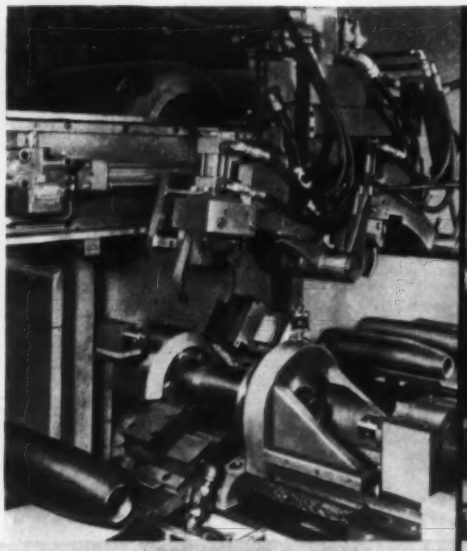
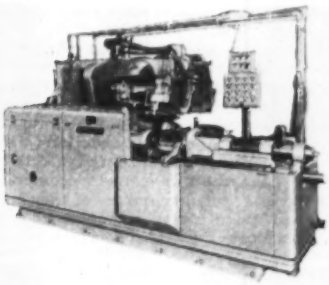
OPTICAL COMPARATORS • AUTOMATIC OPENING THREADING DIES & CHASERS



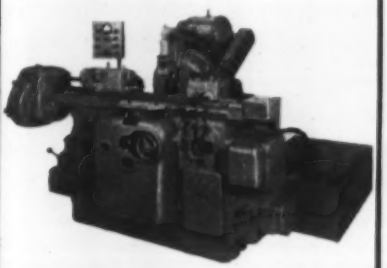
AUTOMATIC HANDLING

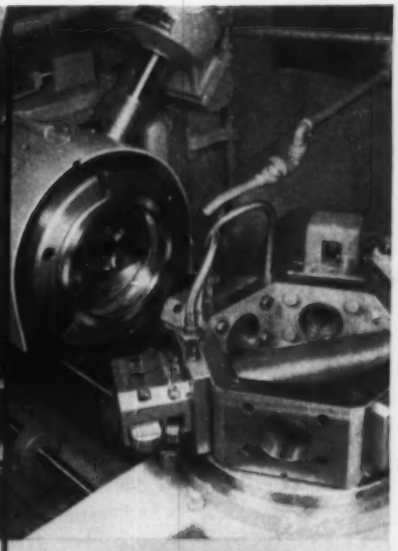
Completely automatic operation of this Fay Automatic lathe, including *loading*, *machining*, *chip and coolant disposal* and *unloading*, ups production to 180 pcs. per hour at 100% efficiency in the machining of these shells.



NEW METHODS

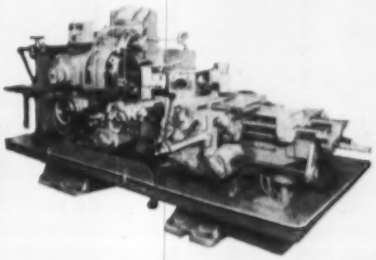
By grinding this worm (stock removal .1235″ — one pass) on a J&L 6 x 36″ Automatic Thread Grinder, production is increased 160% per machine over previous methods.





VERSATILE TOOLING

High production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Turret Lathes. Inner and outer Ball Bearing Races are produced on the same machines. Set up time from one lot to the next does not exceed fifteen to twenty minutes per machine.



Jones & Lamson's unique Procurement Plan offers you a choice of methods for procuring new, high-efficiency equipment. You may buy outright; pay-from-productivity on a variety of bases, at interest rates of 3¼% and lower (add-on); or you may use any of several variations of a truly flexible lease plan.

MACHINE TOOL DIVISION

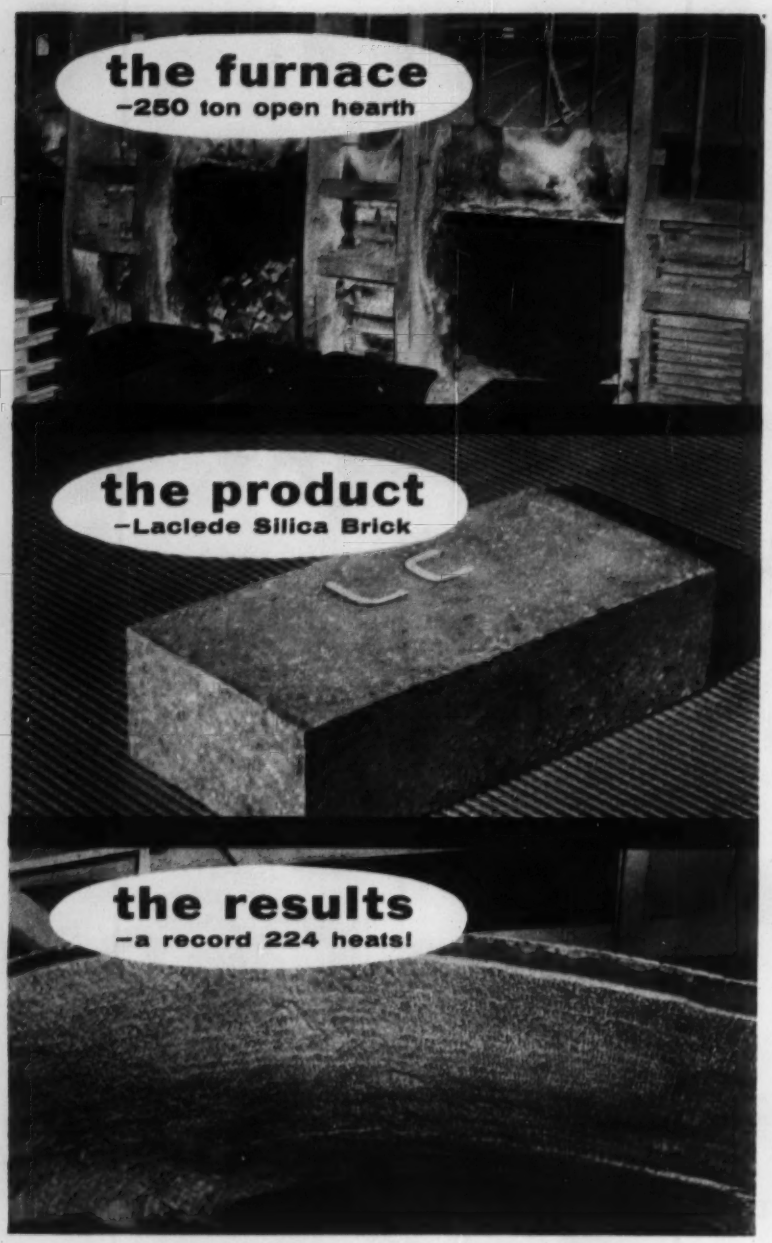
Valuable information is yours for the asking. Simply fill in the coupon below, *clip it to your letterhead*, and mail.

Jones & Lamson Machine Company
517 Clinton St., Dept. 710,
Springfield, Vermont, U. S. A.

Please send me the Jones & Lamson *Machine Tool Replacement Information Kit.*

Name .....

Title .....



LACLEDE-CHRISTY does it again!

What more can you ask? Laclede-Christy Silica Brick completed 224 heats in the roof of a 250 ton open hearth furnace at a leading midwest steel mill. Based on a year's average, Laclede-Christy out-lasted other silica brick by 27 to 67 heats—for an average savings of *at least* 30%!

Is this the kind of refractory service you're looking for? Your source of supply—Laclede-Christy—is nearby.

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Mission 7-2400

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LETTERS
TO THE EDITORS

Story Is Required Reading

Your article, "What Cost Price Fighting?" (July 25, page 41), is required reading for everyone connected with our company.

We have been hearing quite a lot about price competition as though it were something brand new. It isn't. It has always been with us; it always will be. It never has made sense; it never will. It makes less sense in this year of the greatest activity in the metal cutting industry.

We are on record as being unalterably opposed to reducing our quality.

C. V. Briner
Manager, Gage Division
Pipe Machinery Co.
Wickliffe, O.

Three Shifts or One Shift?

What are the facts that allow the automobile industry to conclude it is better to buy more high cost equipment to reduce overtime cost rather than to absorb the present overhead by working the equipment more hours? This was stated in the paragraph, "A Spur for Expansion," in the Metalworking Outlook column of June 20 (page 53).

We have thought it more economical to have a small number of machines manned three shifts rather than a lot of machines manned on a single-shift basis. We further have believed that rather than buy more equipment, it is more economical to operate our plant six days, even seven.

This is based on the assumption that we will absorb our fixed cost in the first five days. This materially reduces the cost for Saturday and Sunday work. We pay overtime at the rate of 1½-times on Saturday, double time on Sunday.

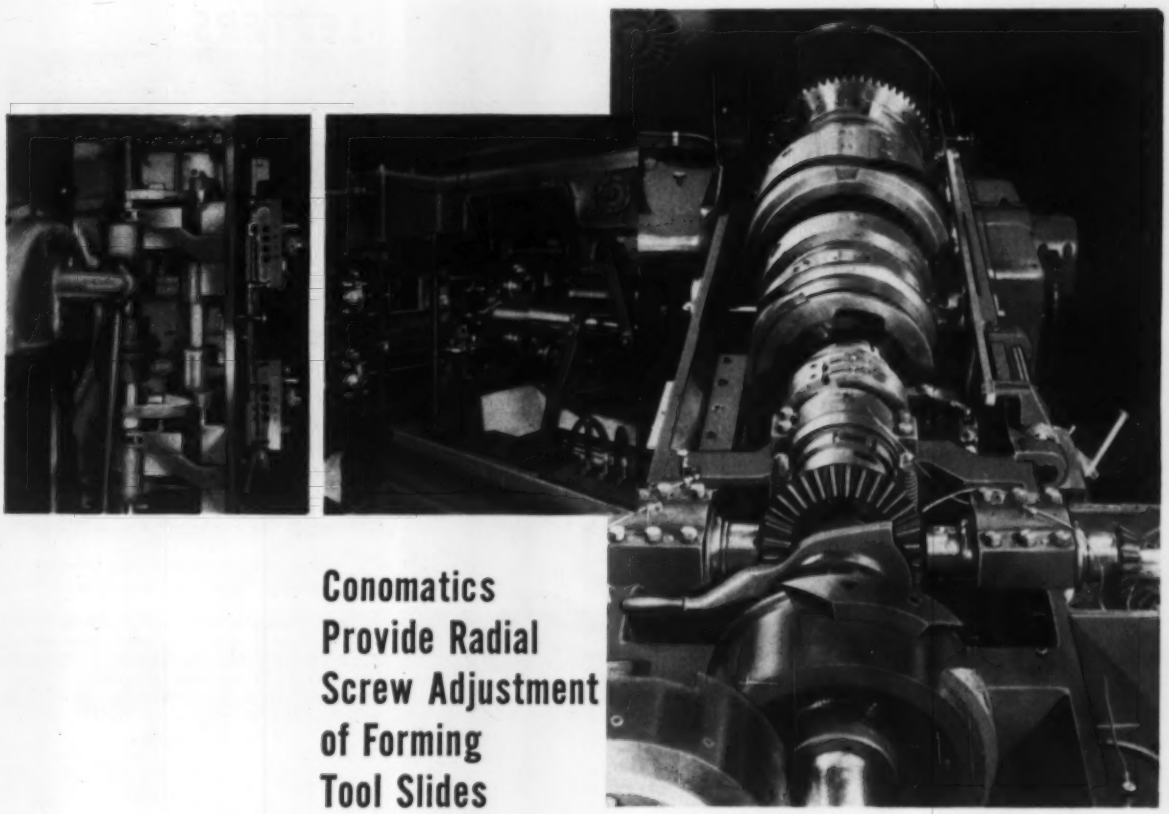
Kenneth L. Tingley
Superintendent
Continuous Strip Mill
Scovill Mfg. Co.
Waterbury, Conn.

• *At the risk of oversimplification, here, are some of the tenets:*

1. Because of the auto industry's yearly cycle of model changes, much of its equipment must be written off in a short time. From an internal accounting standpoint, it can't amortize a good portion of its equipment on the basis of output or hours of use as other industries can. There's little incentive for getting in hours just for the sake of hours. As overtime costs mount, the urge to reduce overtime hours grows proportionately stronger.

2. Overtime and multiple shifts are resorted to if demand warrants. Facilities are meant to meet only the minimum demand on a single-shift, no-

(Please turn to page 12)

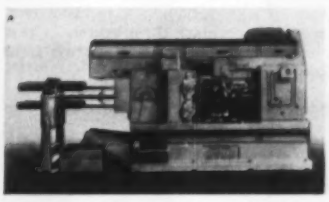


Conomatics Provide Radial Screw Adjustment of Forming Tool Slides

Models 2⅝" LA, 3½" AD, 5" KL, and 5¼" KR Conomatic Four Spindle Bar Machines are equipped with a number of quick job-change features. One of these is the all-position end attachment drive for the mounting of endworking opposed spindles in all positions, with independent feed to as many as three opposed spindles on a single setup.

Another feature that is of considerable importance in tooling up is the radial screw adjustment of all sideworking slides. Trial cuts may be taken to correct diameters with form tools without changing the clamped positions of the form tool holders.

All Conomatic quick changeover models are equipped with dial adjustment of the working stroke of all tool carrying slides. Besides the Four Spindle machines there are three quick change Six Spindle models in 9/16", 1" and 1⅝" sizes.
Write, wire, or phone for literature.



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

Model MOD OIL-ACTUATED Multiple Plate Clutch (inset) is one of 6 Twin Disc Machine Tool Clutches incorporated in this power driven 8' Rotary Table with 50-ton capacity—manufactured by one of the world's largest machine tool makers, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

Why 6 Twin Disc Clutches are *standard* on new Giddings and Lewis Rotary Table

For *more constant* torque transmittal . . . *longer* wear life . . . *adequate* capacity in a small package . . . *elimination* of adjustment . . . and remote control at *minimum cost*—Giddings & Lewis uses *six* Twin Disc OIL-ACTUATED Multiple Plate Clutches as standard equipment for their new power driven 8' rotary table with 50-ton capacity. Included are: (1) Model MOD-806 and (2) Model MOS-806's on feed drive, with (3) MOS-806's on main transmission.

The Models MOS (single) and MOD (duplex OIL-ACTUATED Multiple Plate Clutches are Twin Disc's answer for a high energy, high inertia, high horsepower clutch especially adaptable to applications creating high temperatures and operating under heavy, abusive loads.

Both models are readily adaptable to remote or push button control without mechanical linkage. Since the floating or pressure plate forms the ram of the cylinder, ram travel increases automatically as plate stack wears. This eliminates adjustments to compensate for plate wear and constant torque transmitting ability is thus provided during entire life of clutch plates.

Find out how these OIL-ACTUATED Multiple Plate Clutches can be applied to your machines—write today to Twin Disc Clutch Company, Racine, Wis.

TWIN DISC

TWIN DISC Clutches

LETTERS

(Concluded from page 10)

overtime basis. By going to overtime and multiple shifts, they can rapidly expand output (which they did this year to meet the unexpected needs for an estimated 8 million cars).

3. Round-the-clock operations have little cost advantage for automakers. While it costs money to start and stop a continuous rolling mill, there's little premium involved in starting and stopping a stamping press.

STEEL Mails Money Back

We would appreciate your sending us the article, "Business Consultants: Their Uses and Limitations" (Aug. 15, page 123). This was listed as No. 95.99 in the *Distribution Data Guide* (September, 1955), published by the U. S. Department of Commerce.

Enclosed is a money order for 50 cents—the cost listed in the Guide.

W. H. Grant
Regional Manager
East Central Regional Office
Air Conditioning Division
General Electric Co.
Cleveland

• *This is one of many letters requesting this article in which 50 cents was enclosed.* Distribution Data Guide *is listing the charge for a single copy of* STEEL. *This article is available as a reprint. No charge is made for one to three reprints. The money is being returned.*

Guides to Purchasers

I wish to request one copy of the Metal Selector (insert) and the Arc Welding Electrode Buyers Guide (page 142) in the Oct. 10 issue. We will find these articles of use in our purchasing department.

We enjoy your fine publication throughout our offices.

J. Gilbert Blue
Purchasing Dept.
Fisher Governor Co.
Marshalltown, Iowa

Navy Lauds Value Analysis

Your article, "Value Analysis" (Sept. 19, page 101), was most enlightening and timely.

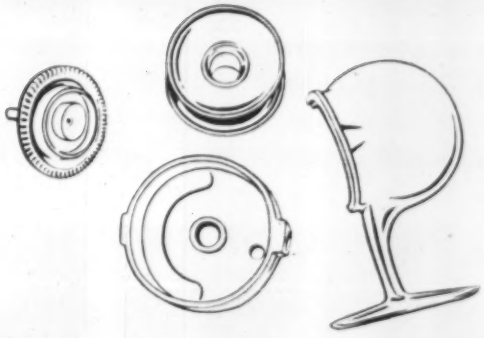
As you state, the U. S. Navy has embarked on such a program within its industrial establishment under the name of value engineering. The fruits of the effort will be most welcome to all of us who want the greatest possible return for our invested dollar—whether in industry or in national defense and security.

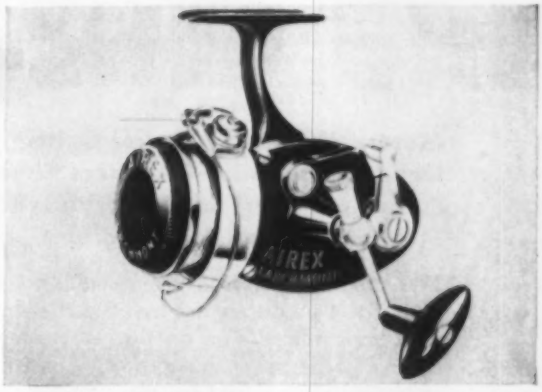
I would appreciate three copies of this article to stimulate interest in this field at this shipyard.

All parts of the 1955 Program for Management have been excellent in scope and presentation.

Commander James V. Hogg, USN
Production Analysis Superintendent
San Francisco Naval Shipyard
San Francisco

Another field report on "TRICLENE"® D





HIGHLY POLISHED PARTS of the Airex spinning reel are made from five different metals. To clean them all quickly and thoroughly takes just a single degreasing operation with All-Purpose TRICLENE D.

AIREX–fishing reel manufacturer–finds: TRICLENE® D gives brighter cleaning... cuts degreasing time in half

BRIGHT, THOROUGHLY CLEAN aluminum-zinc die castings are removed from the vapor degreaser at Airex Manufacturing Co. TRICLENE D is used by Airex to give fast, efficient, trouble-free degreasing.

Airex Manufacturing Co., of Hillside, N. J., uses parts made of five different metals in its popular spinning reel—aluminum, brass, copper, steel and zinc. Many of the parts are highly polished. Originally, some degreasing operations had to be carried out twice to assure thorough cleaning.

When Airex changed to TRICLENE D trichlorethylene, they substantially cut their degreasing time. *In a single operation*, Du Pont's efficient new solvent gives them the thorough, safe, trouble-free degreasing they need. And TRICLENE D cuts maintenance costs, too: Adjustment of solvent pH is no longer necessary... and the time between degreaser cleanouts is now six to eight weeks instead of two.

Locked-in stabilizers give TRICLENE D unsurpassed resistance to *all* major causes of solvent deterioration—heat, light, air, acids and aluminum chloride—yet this rugged solvent contains nothing to harm even delicately machined metal surfaces. TRICLENE D retains its original high purity longer . . . continues to give *brighter cleaning of any metal*, job after job, distillation after distillation. And remember, it costs no more!

FOR MORE INFORMATION about TRICLENE D and how it can bring a new standard of efficiency to your vapor degreasing operation, write to the nearest District Office of the E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

TRICLENE® D

TRICHLORETHYLENE

It's Allis-Chalmers . .

Motors, M-G Sets, Control, Switchgear... Dependable Allis-Chalmers Electrical Equipment Plays an Important Role in Steel Mill Expansion Programs

Demand for specialized steel remains at a record high. Steel producers are meeting the challenge with improvements on existing processing lines, or installation of new facilities for pickling and annealing operations.

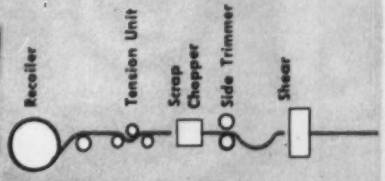
A recent installation of this type in an eastern steel mill featured Allis-Chalmers motors, m-g sets, control and operating stations, and switchgear throughout.

Allis-Chalmers equipment was chosen for this duty because of its record of quality, economy, durability... proven in years of heavy-duty steel mill operation.

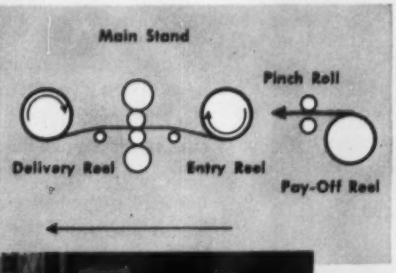
Take advantage of Allis-Chalmers wide range of equipment and service. For help in planning new facilities or modernizing present plants, contact the A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

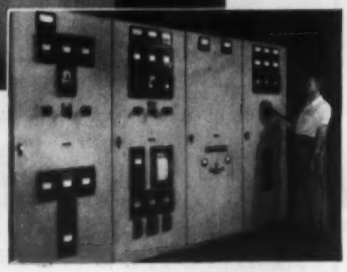
A-4872

PICKLING LINE



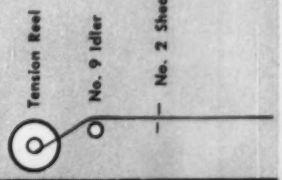
REVERSING MILL





Overall view of new reversing mill motor room showing main motors, m-g sets, control, and 11,000/480-volt substation. Inset shows Allis-Chalmers 15-kv high voltage switching equipment for the motor-generator set and substation.

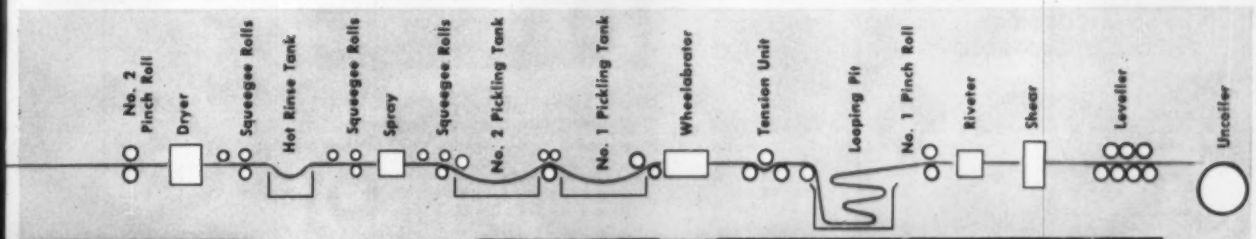
BRIGHT ANNEALING LINE



Delivery end of new annealing line. Allis-Chalmers desk-type operators' control stations, as shown here, are used throughout these modern new facilities.

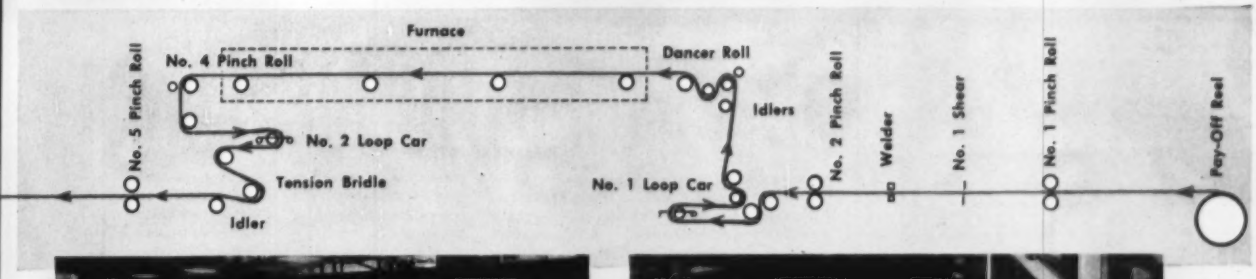
ALLIS-

. . All Along the Line

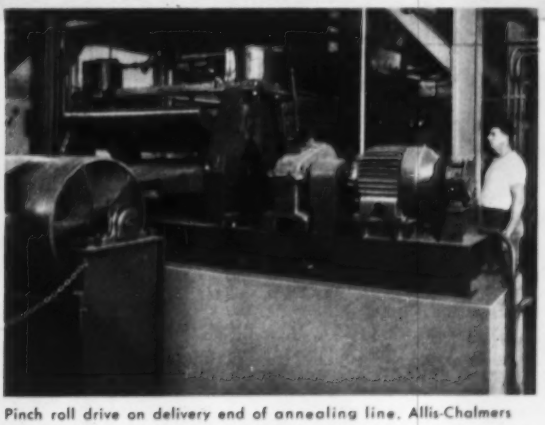


Operator's station, entry end, 36-inch hot-rolled pickling line. Allis-Chalmers control, initiated from desk, gives positive, precision control of material speed.

Allis-Chalmers dc control board and metering panels, m-g set, on delivery section of the pickling line.



Allis-Chalmers m-g set and dc control board on the annealing line. Allis-Chalmers m-g sets and controls are recognized in the steel industry for dependable, economical service.



Pinch roll drive on delivery end of annealing line. Allis-Chalmers fan-cooled motors drive various parts of the processing line.

CHALMERS

making a
MARKED IMPROVEMENT
in 2-COLOR
PLASTIC LID MARKING

Popular new plastic container lids present unusual marking problems. Markem—source of better marking methods for 44 years—solves them. A new Markem machine prints complete label detail and decorative or trademark designs—in two colors—on polyethylene, styrene and paperboard lids, at production rates. Automatic feed and ejection equipment is available. If your problem is marking container lids—or some other part, product or package—let Markem help you. Write Markem Machine Company, Keene 30, New Hampshire.

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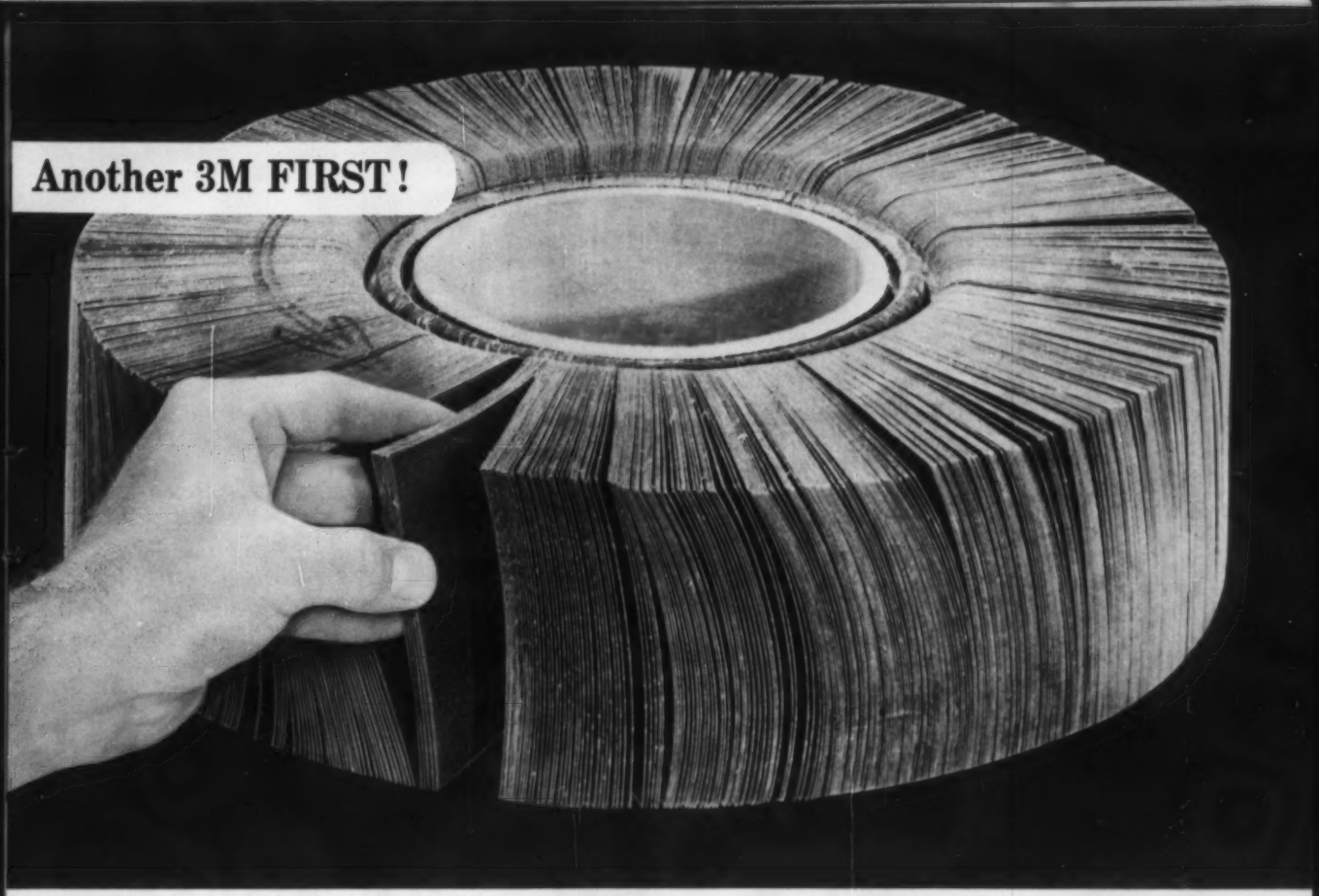


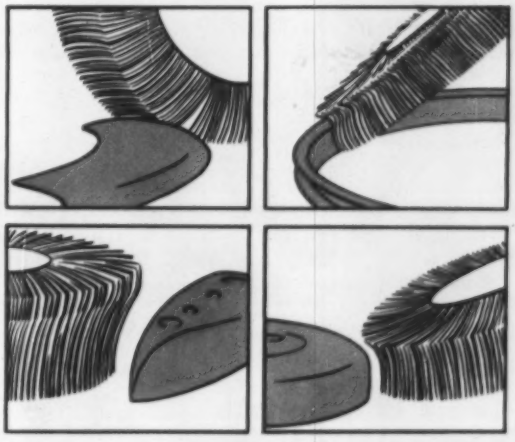
Now! 3M Introduces the "PG" Wheel

Obsoletes all other known methods for polishing and buffing contoured and flat surfaces prior to plating, painting or developing architectural finishes

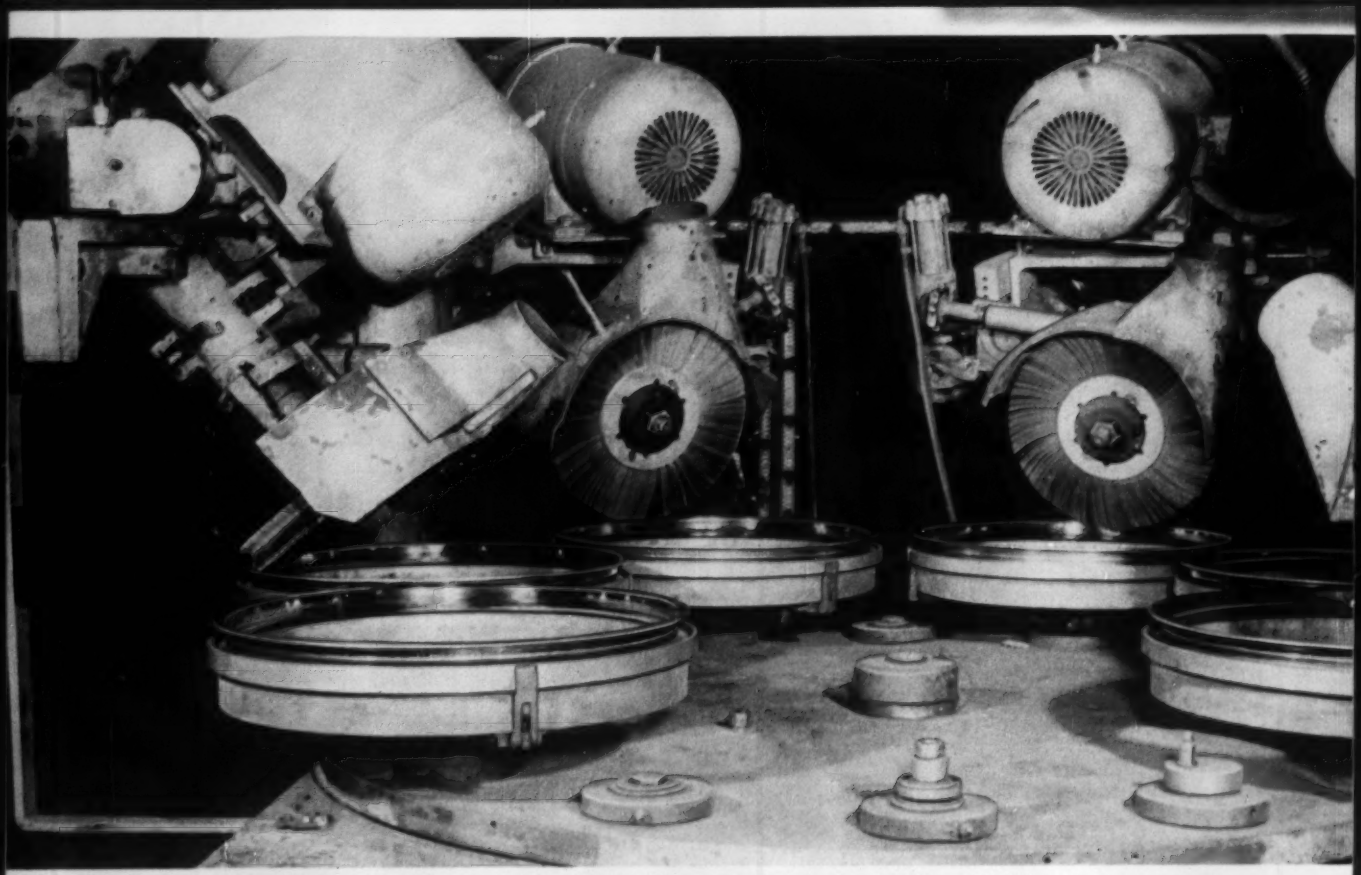
The amazing new "PG" Wheel is a revolutionary new concept in coated abrasives application—the most significant development in the polishing field in the last 15 years. It reduces costs, increases production, improves finishes.

The "PG" Wheel—formed of over 1000 segments of cloth-backed 3M Coated Abrasive—is *self-conforming* and retains its shape throughout its working life. It requires *no* "breaking in" or dressing. It performs *all* the jobs formerly done by such methods as set-up wheels, sisal buffs, and rag buffs, yet also removes stock, if desired—features which no other coated abrasive on the market today can equal.

Installations in many plants have demonstrated that its production life is almost unbelievable. For example, in one plant a "PG" Wheel lasted 35 *hours* compared to a maximum of *15 to 20 minutes* for set-up wheels performing the same operation. At this same installation, where several "PG" Wheels turning at different RPM's were tested, the *lowest* "PG" Wheel life was 13 hours.



See "PG" Wheel Production Reports on following pages

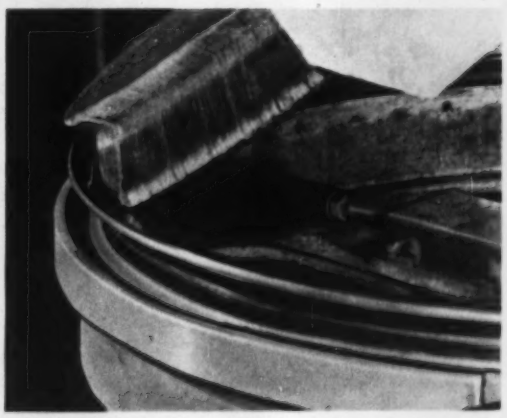


"PG" WHEELS polish the entire inside area of Schwinn bicycle wheel rims. Fixtures holding rims revolve at 16 RPM on the rotary automatic machine. Dwell time at each grinding station is 10 seconds.

"Impossible" polishing job solved with "PG" Wheels!

Polishing the complete inside rims of 10-10 cold-rolled carbon steel bicycle rims was formerly an impossible job for the Arnold Schwinn Company of Chicago. This nationally known manufacturer was using set-up wheels and sisal buff wheels to blend flash weld on the rims, but was unable to polish them completely prior to plating.

Recently, this company tested 3M's amazing new "PG" Wheels on a rotary automatic machine. They found that three "PG" Wheels—a Grit 220 and Grit 240 Three-M-ite Resin Bond and a Grit 320 Tri-M-ite Resinite—perform the *whole* operation formerly done with set-up wheels and sisal buffs, *and* completely polish the inside wheel rim.



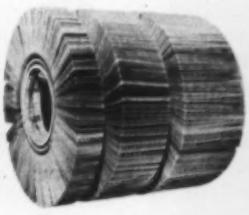
"PG" WHEEL conforms itself to sharp contours. It exposes fresh grain as it wears—will retain its shape throughout the entire life of the loading.

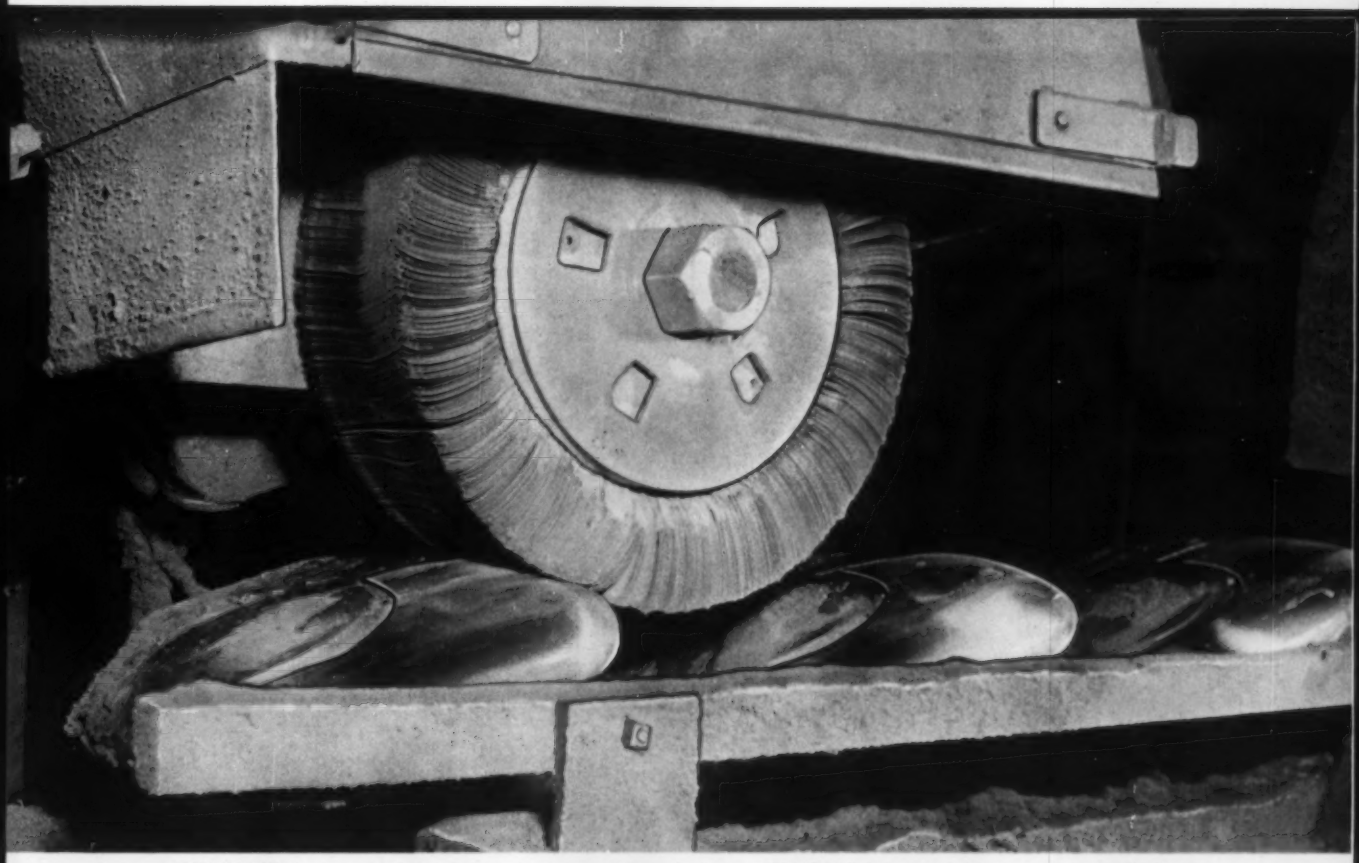
"PG" Wheel specifications

Available in Three-M-ite Resin Bond Cloth and Tri-M-ite Resinite Cloth

Diameters:.....14", 15", 16", 17"
Widths:.....2", 3", 4", 5", 6" *
Grits:.....#150 to #320

*for widths greater than 6", "PG" Wheels may be ganged for desired width.





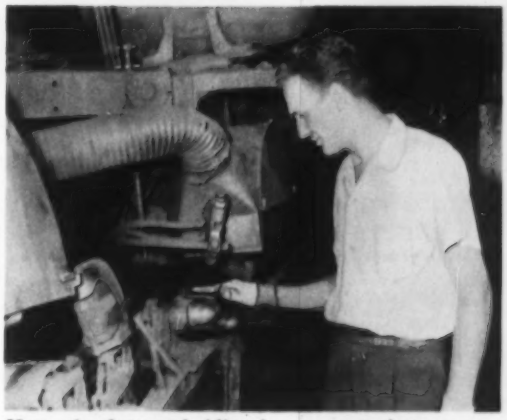
"PG" WHEELS on an automatic straight line machine produce a 4 R.M.S. finish on auto bumper guards. Each "PG" Wheel polishes an average of 11,000 guards—lasts far in excess of an 8-hour shift.

"PG" Wheels increase production 80%

Oakman Plating Co., of Detroit, Michigan polishes cold-rolled steel auto bumper guards prior to plating. Its former method, using 12 set-up wheels and 8 sisal buffs, produced 2500 units per 8-hour shift with a 5 to 6 micro-inch finish. Set-up wheels seldom lasted more than *20 minutes* on the job before having to be replaced.

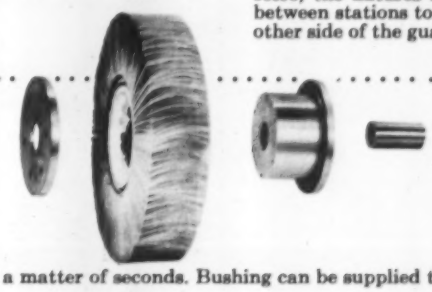
A 3M Engineer suggested that a test be made with "PG" Wheels. It was found that 13 "PG" Wheels of various grits replaced *all* set-up wheels and buffs—produced a 4 to 5 micro-inch finish—and increased production to *4500 units per 8-hour shift!*

Reason for this amazing production increase is that each "PG" Wheel lasts for several 8-hour shifts—down-time to replace set-up wheels is eliminated. Too, because of the better finish obtained with "PG" Wheels, the bumper guards' ultimate plated finish is far superior.



Here, the fixtures holding bumper guards turn over between stations to permit "PG" Wheel to polish the other side of the guard.

"PG" Wheel Assembly



FLANGE
WHEEL
HUB
BUSHING

3M's new "PG" Wheel can be assembled in a matter of seconds. Bushing can be supplied to fit any size drive spindle.

"PG" Wheel Production Reports . . .

Houdaille Hershey, Decatur, Illinois

PRODUCT: High quality automobile bumper guards.

OPERATION: Polishing over-all surface prior to plating.

3M METHOD: With the "PG" Wheel the quality of the bumper guard was greatly improved and this company is now obtaining far superior plated surfaces.

Unity Manufacturing Co.,
Chicago, Illinois

PRODUCT: Deep-drawn brass spotlight shells and steel foglight shells.

OPERATION: Remove draw marks, and scale, and polish over-all surface prior to plating.

PREVIOUS METHOD: Backstand belts, Grits 220 & 280, over entire surface.

3M METHOD: "PG" Wheel replaces #280 belt. Production costs lower. Greatly improved pre-plated surface. Ultimate appearance after plating: far superior.

Houdaille Hershey, Huntington, West Virginia

PRODUCT: Automobile bumpers.

OPERATION: Polishing contoured ends prior to bright nickel plating.

3M METHOD: With "PG" Wheels, the finish on the pre-plated surface was greatly improved, permitting a higher quality plated surface on the finished bumper.

Send coupon TODAY for full facts!

Minnesota Mining and Mfg. Co.
Dept. GJ-115, St. Paul 6, Minn.

☐ Send me case history reports on the "PG" Wheel

☐ Please have 3M Representative call

Name.....

Title.....

Company.....

Address.....

City.....Zone...State.....

PRODUCT OF 3M RESEARCH

3M ABRASIVES

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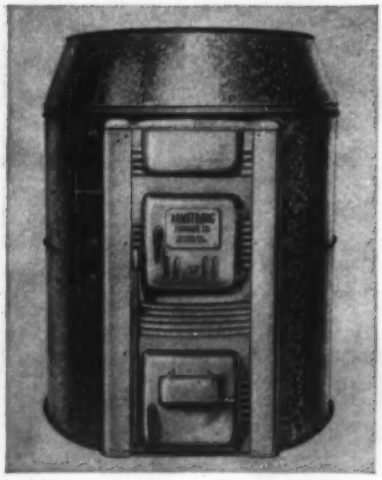
1001 things now being done by

COLD-ROLL FORMING



As your production requirements grow, new opportunities for effecting economies are offered by cold roll forming components. A few applications are illustrated here: The structural parts of the new Giant 74-ton Boeing Stratofreighter KC-97G are, as in most other planes, made almost entirely from cold-roll-formed shapes because of their high strength-weight ratio.

In the modern warehouse shown at left, the steel decking and rolling steel doors were cold roll formed and installed by the R. C. Mahon Company, Detroit, Michigan.

In the photo of an Armstrong furnace below, the arrows point to the jacket rings and two pilasters framing the front openings—all cold roll formed at a big saving compared with previous methods.

The new Yoder book on Cold Roll Forming is an illustrated story of many of the things which are made lighter, stronger and more accurately by this process than by any other, yet at greatly reduced cost. It is also a complete textbook on the machines, their tooling, operation, and economic possibilities.

A copy is yours for the asking.

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

- **COLD-ROLL-FORMING** and auxiliary machinery
- **GANG SLITTING LINES** for Coils and Sheets
- PIPE and TUBE MILLS—cold forming and welding

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IT'S OUT OF THIS WORLD

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BRIGHTER

CLEANER

SMOOTHER

A new "Ingredient of Quality" in B & L Cold Drawn Bar Steels which has won Nation-Wide Acceptance of Industry

* Trade-Mark Pat. Pend.

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NON-LUSTERIZED

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gives complete, automatic arc control

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magnetic amplifier-rectifier *DC Welder*

in 200, 300, 400 Ampere Models

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it's the greatest advancement in OBI press history

NIAGARA FRONT-TO-BACK

ALL NEW rugged, front-to-back crankshaft with huge crankpins

compact, fully concealed driving mechanism

ALL NEW enclosed, rigidly supported gearing in sealed oil bath

electro-pneumatic friction clutch on crankshaft

ALL NEW wider spaced, longer, narrower gibs

wider, box type slide all within gibbing

ALL NEW precision, hardened, longer-wearing gears

compact, straight-line, space-saving frame

Hailed as the greatest achievement in modern OBI press design and performance, by over 100,000 spectators who examined this mechanical marvel at the Machine Tool Show, the all-new Niagara Series E, Single Point, Open Back Inclinable Press starts a brand new chapter in press history.

It's years ahead of any OBI ever built. It's an industrial revolution all by itself. No other press, in modern times, embraces so many "All-New" features.

Gone are exposed, overhanging gears, flywheel and other mechanisms. Gone is excessive and damaging crankshaft deflection. Here to stay are: Full support to wide dies. Greater resistance to off-center loading. Accurate alignment of slide, with minimized tendency to cock. Substantially increased die life. Longer lasting, hardened gears. Smoother, safer press performance. Smaller floorspace requirements.

Built in 4 sizes, with shaft diameters from 4½ to 7½ inches and capacities from 75 to 200 tons, the new Series E is available in both standard models and automation models equipped with the most advanced controls and devices for peak production. A complete description of both, with full specifications, is given in new Bulletin 56, sent promptly on request.

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CRANKSHAFT OBI PRESS DESIGN

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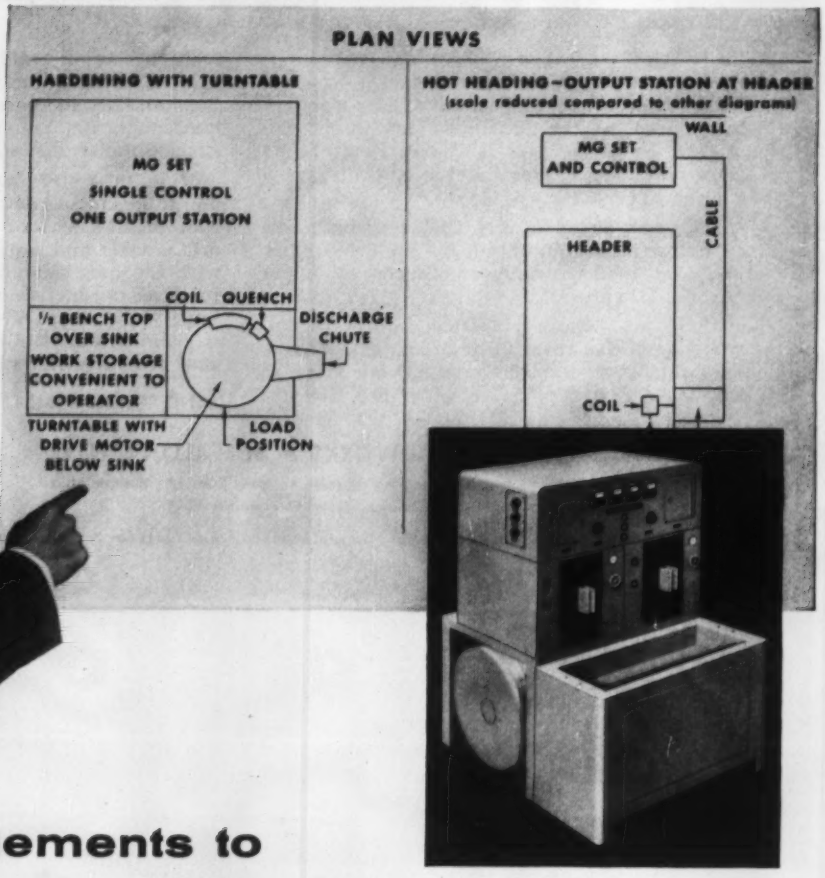
For General Purpose Production

MODIFIED DESIGN
For Automation Lines

New 30-kw

induction heater . . .



32 arrangements to meet your own production setups

Simplified building-block design of the new Westinghouse 30-kw induction heater brings you unequaled flexibility. You get 32 regular combinations, plus a number of special arrangements to fulfill your low-power induction heating jobs. Result: induction heating changeovers can be made quickly, easily to adapt to your varying production arrangements.

Easy To Use—front of worktable, free of controls, can be used for mounting work-handling equipment. Instruments at eye level for easy readability. Buy the equipment you want, adapt it when your needs change: single to two-station operation—sink to bench top—high-voltage to low-voltage output—grouped as a compact unit to remotely located output stations.

Versatile—you get a custom-built installation of standardized equipment to handle a wide variety of applications. Unit ideal for hardening, annealing, brazing or soldering.

Equipment consists of four basic units: (1) 30-kw, water-cooled, 10,000-cycle m-g set, (2) generator control cabinet, (3) high-frequency output cabinet, (4) worktable.

For more information about improving your induction heating operations, call *The Man With The Facts*—your Westinghouse sales engineer. Ask him for your copy of booklet B-6555, or write Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pa. J-02298

YOU CAN BE SURE...IF IT'S

Westinghouse

CALENDAR
OF MEETINGS

Nov. 7-9, American Society for Personnel Administration: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Society's address: P. O. Box 1413, Milwaukee, Wis. Secretary: Russell L. Moberly.

Nov. 9-10, Council of Profit Sharing Industries: Annual conference, Huntington-Sheraton hotel, Pasadena, Calif. Council's address: 327 W. Madison St., Chicago 6, Ill. Executive secretary: Joseph B. Meier.

Nov. 9-10, Society of Automotive Engineers Inc.: Fuels and lubricants meeting, Bellevue-Stratford hotel, Philadelphia. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Nov. 9-11, Industrial Management Society: Annual time and motion study and management clinic, Sherman hotel, Chicago. Society's address: 35 E. Wacker Dr., Chicago 1, Ill.

Nov. 9-12, National Association of Aluminum Distributors: Annual meeting, Arizona-Biltmore hotel, Phoenix, Ariz. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: R. Bruce Wall.

Nov. 10-11, American Zinc Institute Inc.: Fall meeting, Galvanizers committee, Drake hotel, Chicago. Institute's address: 60 E. 42nd St., New York 17, N. Y. Secretary-treasurer: E. V. Gent.

Nov. 13-18, American Society of Mechanical Engineers: Annual meeting, Congress, Hilton and Sheraton-Blackstone hotels, Chicago. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Nov. 14-16, National Metal Trades Association: Annual convention, Commodore hotel, New York. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Nov. 14-17, International Automation Exposition: Navy Pier, Chicago. Information: Richard Rimbach Associates Inc., 845 Ridge Ave., Pittsburgh 12, Pa.

Nov. 14-17, Wire Association: Annual meeting, LaSalle hotel, Chicago. Association's address: 453 Main St., Stamford, Conn. Secretary: Richard E. Brown.

Nov. 14-18, Chicago Exposition of Power & Mechanical Engineering: Chicago Coliseum, Chicago. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Nov. 14-18, National Electrical Manufacturers Association: Annual meeting, Traymore hotel, Atlantic City, N. J. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

Nov. 16-18, Society for Experimental Stress Analysis: Annual meeting and exhibit, Sherman hotel, Chicago. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

Nov. 27-30, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, Detroit. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Nov. 27-Dec. 2, American Institute of Steel Construction Inc.: Annual meeting, Boca Raton hotel and club, Boca Raton, Fla. Institute's address: 101 Park Ave., New York 17, N. Y. Secretary: M. Harvey Smedley.

Nov. 28-Dec. 1, Air Conditioning & Refrigeration Exposition: Atlantic City Auditorium, Atlantic City, N. J. Information: Banner & Greif, 369 Lexington Ave., New York 17, N. Y.

Dec. 5-9, National Exposition of Chemical Industries: Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington, Ave., New York 17, N. Y. Manager: E. K. Stevens.

Dec. 7-9, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York, N. Y. Secretary: E. H. Robie.

Dec. 7-9, National Association of Manufacturers: Annual meeting and exhibit, Waldorf Astoria, New York. Association's address: 2 E. 48th St., New York, N. Y. Secretary: Noel Sargent.

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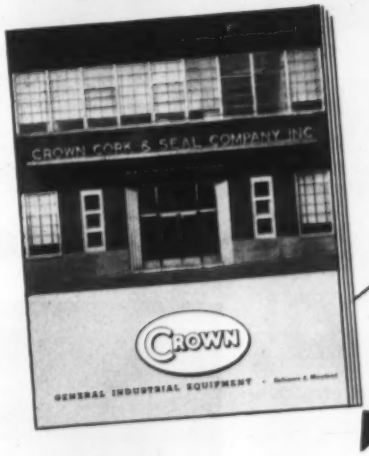

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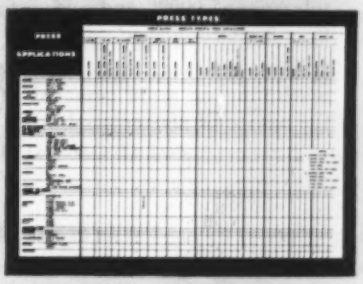

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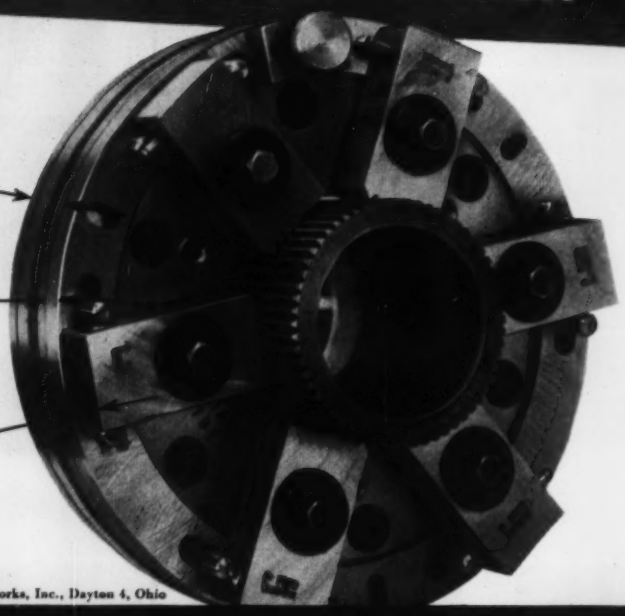

Photo courtesy of Garrison Machine Works, Inc., Dayton 4, Ohio

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As every machinist knows, machine tools impart their precision through their chucks. That's why chuck dimensions and tolerances are of critical importance . . . and why Blanchard Surface Grinders are commonly used to produce the flat surfaces required.

Blanchard Surface Grinders are ideal for all kinds of precision grinding jobs. They produce extremely close tolerances for flatness, size and parallelism . . . *at low costs and high production rates.* Many Blanchard users grind surfaces flat to within 2 to 4 light bands, parallel to less than .0001", with dimension tolerance of .0002", and surface finish to better than 3 micro inches.

Whether your work involves precision machining or rapid removal of stock, take the advice of master machinists . . .

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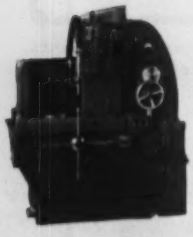

No. 11 Blanchard Surface Grinder

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".

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THE BLANCHARD MACHINE COMPANY

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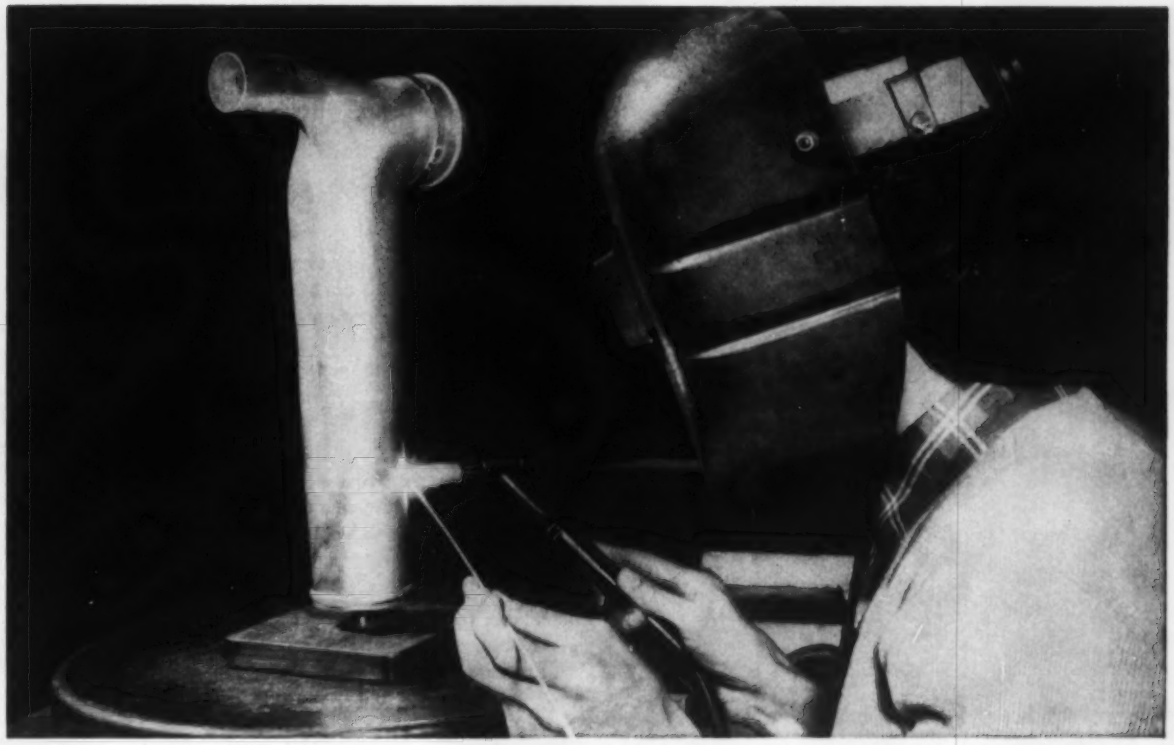
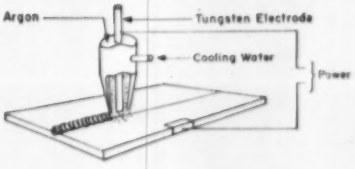


Sound Welds in 33 Seconds ...by HELIARC Welding



Each of the six appendages of these 52S aluminum aircraft manifolds is HELIARC welded to the tubular main section in from 20 to 45 seconds . . . The spatter-free, flux-free HELIARC welds need no cleaning or finishing—costs are kept at a minimum.

The parts are aligned in a special jig, and tack-welded in position using a lightweight HELIARC HW-9 torch . . . The finished welds are made while the parts revolve on an electrically operated turntable controlled by a foot-switch. Since each weld is completed in less than a minute, production rates are high . . . Here are some of the advantages of HELIARC welding:

- Joins nearly all commercial metals including non-ferrous and high temperature alloys.
- Heat highly concentrated within the area of the weld minimizes distortion.
- Makes all type joints in all positions on metals .020 in. and thicker.
- Portable manual equipment, and semi-automatic and automatic units for all job needs . . . Semi-automatic hand-guided HELIARC welding attains speeds up to 50-in. per minute.

Start saving now—call your local LINDE representative for more information and ask for Form 7942, "Modern Methods of Joining Metals."

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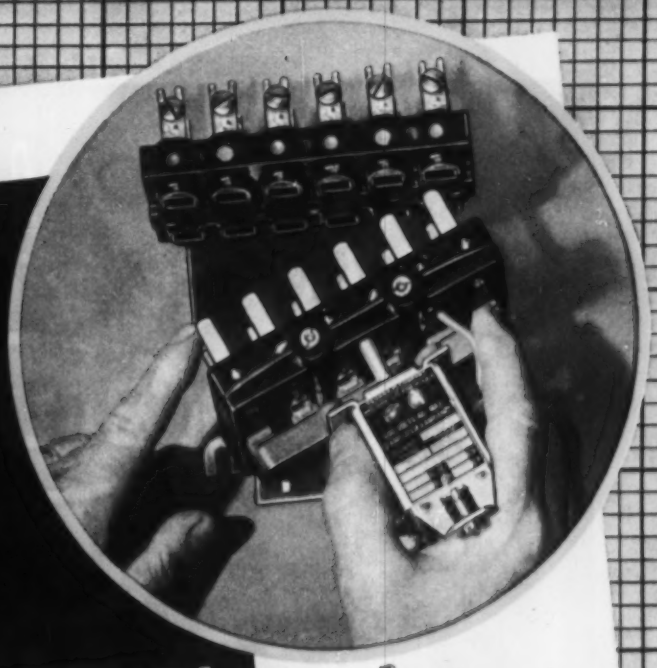

Qwik Change

• A screwdriver and five seconds are all you need to remove this new **PLUG-IN** relay for normal inspection, maintenance or replacement! That's big news in these days of "pushbutton" operations when even a few minutes of down-time can mean thousands of production dollars down the drain.

Square D Field Engineers have sensed this ever-increasing problem in their contacts with machine tool builders and industrial plants throughout the country. Square D design engineers have followed through with this, the first **plug-in** relay built specifically for machine tool use. Another example of design leadership!

HERE ARE OTHER MEMBERS OF SQUARE D's RELAY TEAM

1. **TYPE B** (15 Amperes, 600 Volts) Heavy-duty construction with hardened parts for severe machine tool service
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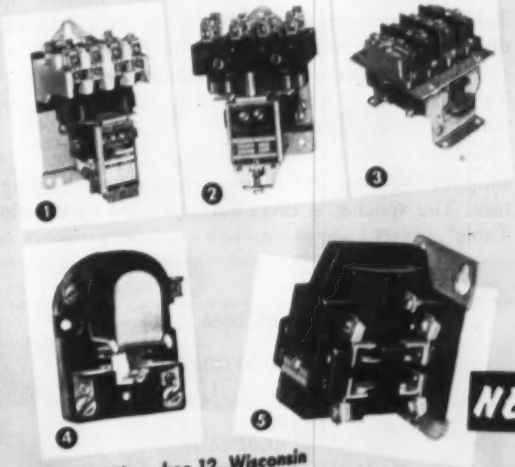
5. **TYPE D** (Rated 10 Amperes, 600 Volts) This new and most compact of all Square D relays is ideal for general-purpose applications involving very limited space



NEW!

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Address Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

Extreme Accuracy ...with a BULLARD Spacer Table

Builders of the P2V-5 Neptune Anti-Submarine Aircraft, The Lockheed Aircraft Corporation, have this to say concerning their experience with the Bullard Spacer Table employed to machine a cast aluminum support for the Sonobuoy Chute.

"Before we used the Bullard Spacer Table, we put this kind of work (boring 3 holes of 5.250 diameter) either into a jig or on a horizontal boring machine".

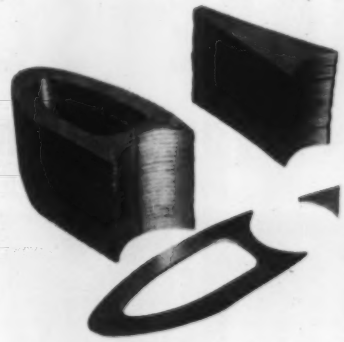
"The reason we put this piece on the Bullard Spacer Table is that the holes are too large for a drill jig and dial spacing for hole location on the horizontal was time consuming. What is more remarkable about the Spacer Table is the fact that it can handle such large diameters with the greatest accuracy.

"Another advantage of the Bullard Spacer Table is the simplified tooling. All we need is a simple holding fixture. The spacing is done automatically by the Spacer Table".

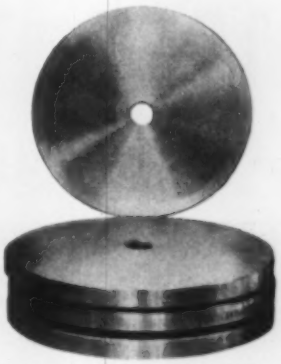
these advantages can be applied to your machining problems. Ask your nearest Bullard Sales Engineer or Distributor or write us for Spacer Catalog

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

Blank size: 3/8" thick x 16½" x 23½"



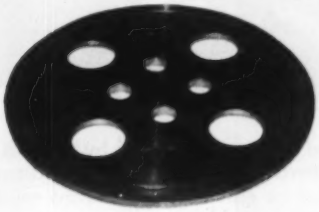
Blank size: 3/8" thick x 9" x 31"



Blank size: 5" thick x 78" OD

Blank size: 4" thick x 7¾" x 71⅜".
Illustrations show before and after machining.

All the products illustrated here were flame cut, sawed, abrasive cut, sheared or machined from stainless steel plate.



Blank size: 2" thick x 60" OD

Stainless steel plate produced to your specifications for quick delivery

Confidence in Carlson service has made G. O. Carlson, Inc. the country's leading specialist in stainless steel plate. As we grew to this position in the industry, we learned and developed new methods of working stainless plate.

What does this mean to you?

It means you can buy for quick delivery exactly what you need in stainless steel plate—sheared, sawed, flame cut, abrasive cut, or machined. And this is true whether the job is a "toughy" or "run of the mill"!

When you need stainless steel plates—special patterns like these or plain rectangles—you'd better try Carlson service, where experience pays off.

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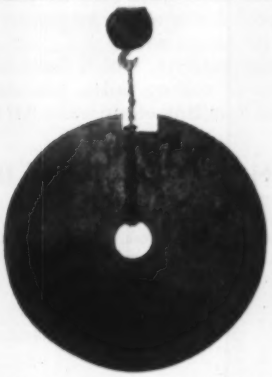
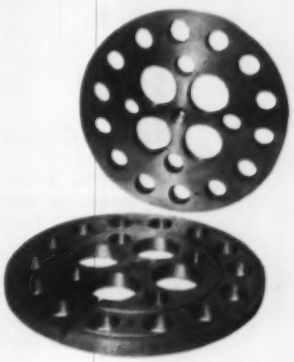


Blank size: 3⅛" thick x 106½" OD

Blank size: ¼" thick x 75" x 88"



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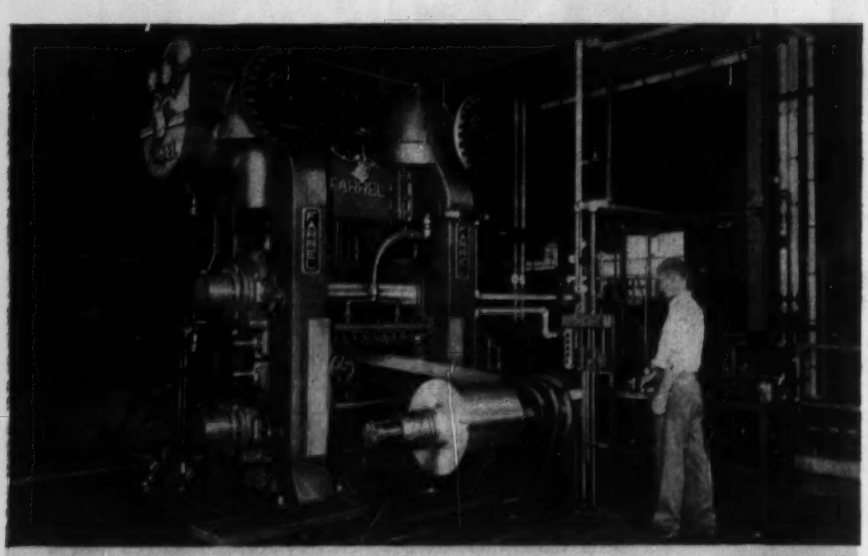
MEET THREE SOLUTIONS

to specific production problems

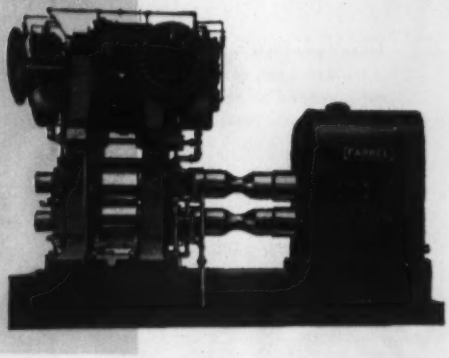


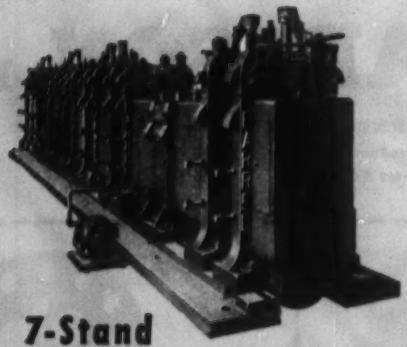
4-High Aluminum Foil Mill

Designed specifically for increasing aluminum foil production, this mill has 9" x 46" work rolls and 21" backup rolls. The speed of mill operation can be varied to meet production requirements by means of an adjustable-voltage control system.

High Carbon Cold Strip Mill

10" x 10" mill specially designed for close gauge control in continuous high-speed, cold rolling of high-carbon strip steel.





7-Stand Hot Copper Rod Mill

Seven-stand, two-high (nominally three-high) hot copper rod mill finishing train, with three low stands for handling ovals, and four high stands for handling squares.

Each mill illustrated here was designed by us with the particular requirements of the individual customer in mind. Each provided an efficient, economical solution to a specific production problem.

A Farrel® mill designed to meet *your* exact needs could be equally advantageous. Just give us your requirements, or, if you prefer, one of our engineers will be glad to discuss your problems with you.

Send for a new 36-page bulletin, which describes in detail Farrel's broad line of rolling mills, gear drives, pinion stands, and special handling equipment. All built to your requirements.

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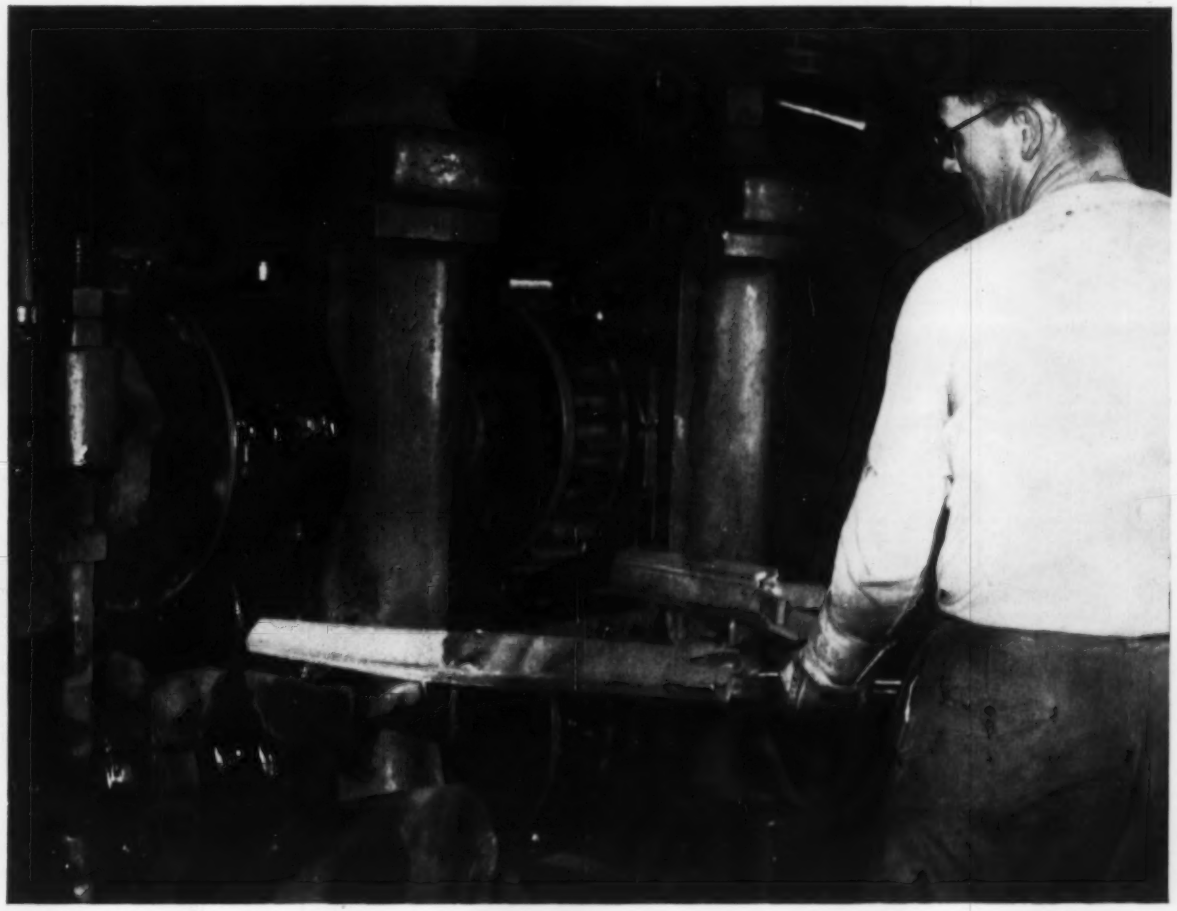

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It's hot off the press with full details on FCC Air Hardening, Oil Hardening and other Cast-to-Shape Tool Steel Specialties that can save you time and money . . . also Composite Die Sections, and Smooth-Hammered Forgings in a wide range of tool and stainless steels. *Don't wait—get your copy NOW.*

Write Today
ADDRESS DEPT. S-71

The John Deere Plow Works of Deere & Company formerly used cast grey-iron dies to swage AISI 1070 F steel plow beams. Die life was, at best, a mere six weeks or about 8,000 parts.

They switched to A-L CAST-TO-SHAPE swaging dies of FCC No. 66 tool steel, hardened and drawn to 57-58 Rockwell "C". The new dies ran *fourteen months*—eight hours a day, five days a week—before redressing was necessary. Approximately *83,875 Parts* (over ten times the production) were swaged in that period! Production has been maintained at that level since.

You, too, can save time and money with the modern FCC CAST-TO-SHAPE method of tool and die making. Don't forget, you also buy *less* steel and reduce machining costs. It's a matter worth investigating. ● Check with your A-L representative TODAY . . . or write *Allegheny Ludlum Steel Corporation, Oliver Building Pittsburgh 22, Pennsylvania.*

For complete MODERN Tooling, call

Allegheny Ludlum

AL
FINE TOOL STEELS SINCE 1854

WAD 4661

WEAN EQUIPMENT CORPORATION

22800 LAKELAND BOULEVARD

CLEVELAND-17-OHIO

REPLY TO
22800 LAKELAND BLVD
CLEVELAND 17, OHIO

WARREN OFFICE
347 N. PARK AVENUE
WARREN, OHIO

A letter of interest to Every Press User!

Dear Sir:

During the last year our company has developed a new press of revolutionary design.

We have conducted a series of tests on this machine which has been witnessed by a large group of press experts.

The net impression of these people seems to indicate that our development may preface sweeping changes in the whole field of metal stamping.

It was our original intention to restrict the application of this press to certain specialized industrial fields, but it is now apparent that it has the broadest possible application and the pressure to release general information regarding its performance has been overwhelming.

We, therefore, use this open letter as an invitation to authorized personnel to see this machine in operation.

If you will express your desire in letter form on company stationery, it will receive our prompt attention.

Very truly yours,

WEAN EQUIPMENT CORPORATION

R. J. Wean, Jr.

R. J. Wean, Jr.
President

Wean

FLYING PRESS

Designed primarily for speed of operation, the Wean Flying Press is the first machine of its kind to successfully combine the fast operating advantages of continuously fed strip with dies which move with the strip.

The press differs greatly from conventional machines. Machine tool-like in appearance, it has a minimum of vibration and requires no foundation. In addition to its great speed, it incorporates several new design principles that should interest every press user.

An automatic adjustment of feed length while press is in motion, and the absence of a clutch and brake (the most frequent points of maintenance on conventional presses), are two examples of this advanced engineering.

Wean 60-ton Flying Press stamping out automotive hinge plates at 600 pieces-per-minute, using the same die set which on a conventional press made the parts at a rate of but 90 pieces-per-minute.

Wean EQUIPMENT CORPORATION Cleveland, Ohio

Chicago Newark, N. J. Detroit

saved $222.82 per flash-welded ring!

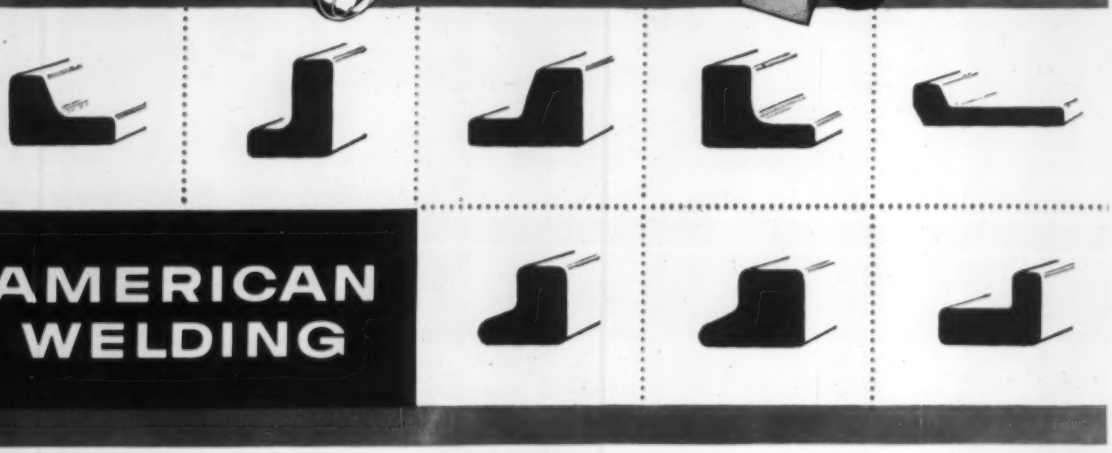
USING AMERICAN WELDING SHAPES

Here is another American Welding mill-rolled section that is saving money for a leading manufacturer of jet aircraft engines. By forming and flash butt-welding a ring from this shape, a heavy and expensive casting is eliminated. On each ring 222 pounds of metal was saved and machining time cut in half. This added up to a whopping $143,718.90 saved on a single order — a typical example of what American Welding is doing for fabricators of circular weldments *and may be able to do for you.*

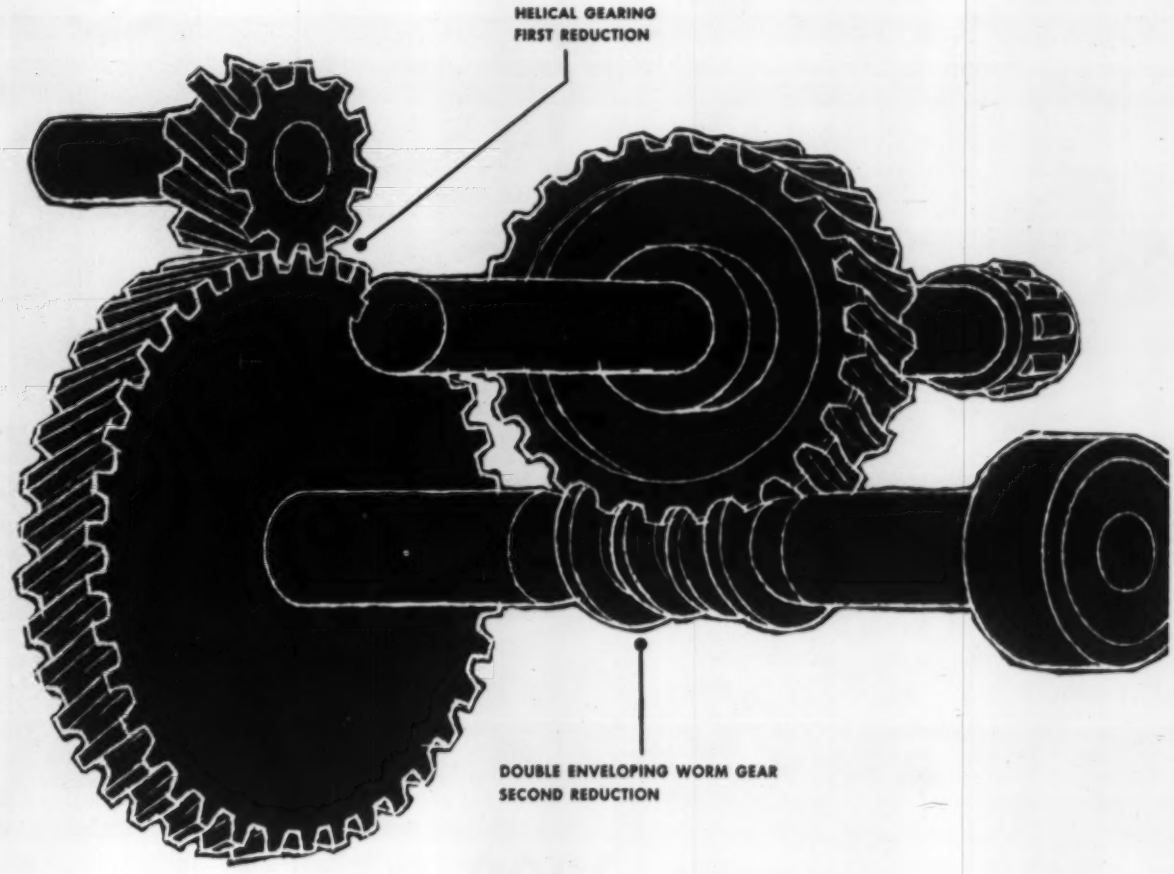
A special mill-rolled shape may be just the answer to your problem. Call or write today — American Welding's Industrial Products Division will be glad to work with you.

THE AMERICAN WELDING & MFG. CO.
130 Elm Road • Warren, Ohio

Ask for free Facilities Catalog. Find out what American Welding can do for you.



AMERICAN WELDING



How Westinghouse new right-angle gearmotor delivers 32% more power

With this exclusive match of gearing, Westinghouse right-angle gearmotor gives you top horsepower and rugged dependability at the lowest cost. It's the result of skillful use of helical gearing to gain maximum efficiency from high lead-angle worm gearing. Over a range of speed reduction, from 20:1 to over 100:1, the Westinghouse right-angle gearmotor *averages* 32% more power than conventional single-reduction, worm gearmotors. At a ratio of 60:1 you actually get 98% more power.

Greater dependability and long life result from Westinghouse exclusive double-enveloping worm gear. It provides 330% more gear-tooth area to support the load. As wear occurs, only double-enveloping gears regenerate or reproduce themselves.

In application, Westinghouse design for high overhung load capacity requires no outboard support. Right-angle gearmotors are available in a complete range of AGMA output speeds and Life-Line® "A" motor enclosures.

FREE detailed facts about Westinghouse new right-angle gearmotor in booklet B-6579. Call your local Westinghouse Sales Office or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-07549

YOU CAN BE **SURE**...IF IT'S

Westinghouse

720 Hours at 2300 Deg. F ...Didn't Hurt This Muffle

Continuous exposure at 2300 deg. F had little effect on a muffle made of HASTELLOY alloy X and used in this electric annealing furnace. The muffle was subjected to the intense heat for an entire month, 24 hours a day. After this extended service it was examined, found to be in excellent condition, and put back in service.

Actually, HASTELLOY alloy X solved a dual problem for this Company. The muffle is used in a furnace for annealing cold-drawn parts. Periodically, it is used for annealing superalloy parts at 2300 deg. F. Most of the time, however, it is used to anneal stainless steel parts at lower temperatures. Other materials were either inadequate for this service or too costly. Only HASTELLOY alloy X could handle both conditions economically.

HASTELLOY alloy X is a wrought high-temperature alloy with excellent strength and oxidation resistance to 2300 deg. F. For a copy of a booklet describing HASTELLOY alloy X, get in touch with the nearest sales office listed below.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Haynes" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation.

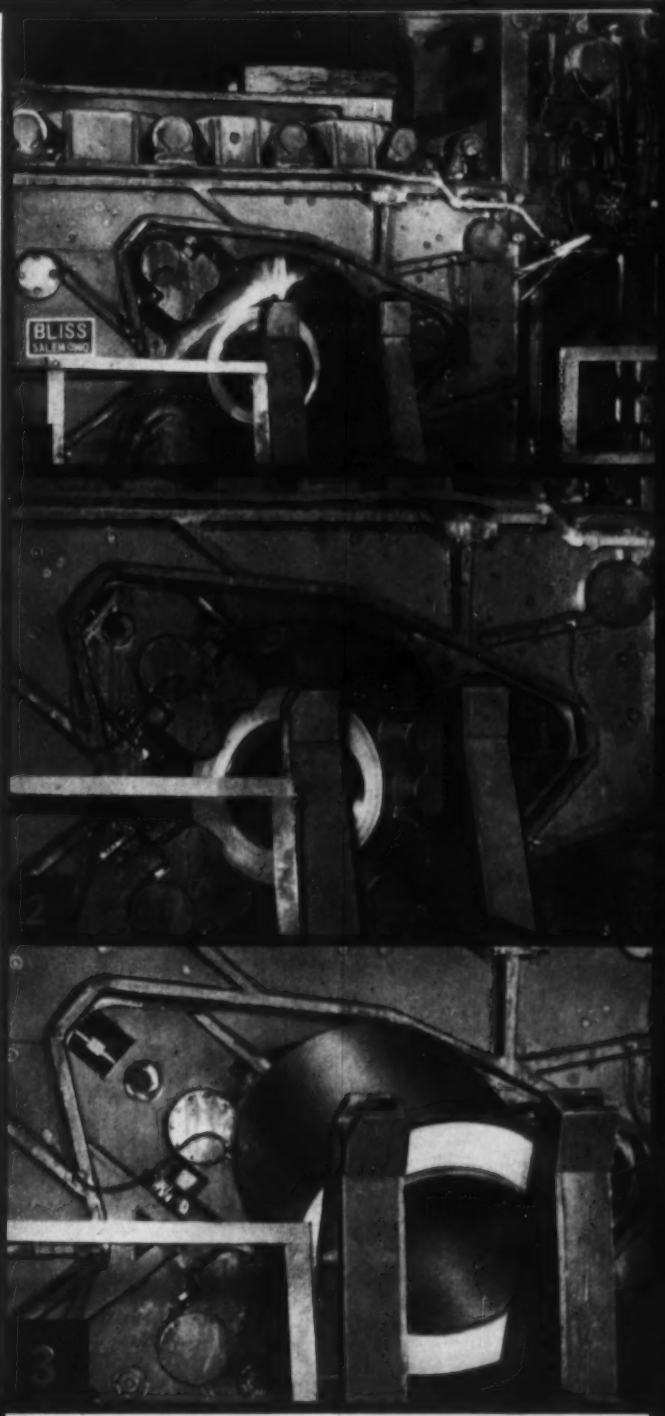
At Youngstown's Indiana Harbor Works...

A NEW BLISS DOWNCOILER FOR BOOMING HOT STRIP MILL

A recently-installed Bliss downcoiler is helping the hot strip department at Youngstown Sheet & Tube's Indiana Harbor Works reduce the strain of maintaining record output levels that have hovered at or near capacity for months. The new Bliss unit increases downcoiler capacity 50%, lightens the load on two older downcoilers.

This is the latest in a series of downcoiler installations in American and foreign steel plants dating from Bliss' development of the expanding mandrel design. The advantage of the expanding mandrel is that the strip end is held firmly during coiling. Thus, the coil is tight, solid and smooth-edged. When coiling has been completed, the mandrel collapses, freeing the coil for easy ejection onto the upender. Surface damage is eliminated: blocker roll controls permit the operator to pull the rolls back from the coil as soon as the mandrel picks up the snubbed end of the strip. The rolls do not touch the strip again until the trailing end is about to be taken up, thus supplying a tightly wrapped coil throughout.

Bliss hot mill downcoilers can be built for any practical strip width and gage, coil weight and run-out speed. If you would like more information about them ... and about other important Bliss rolling mill developments... write for a free copy of our 60-page Rolling Mill Brochure, Catalog 40-A.



E. W. BLISS COMPANY, General Office: Canton, Ohio
ROLLING MILL DIVISION, SALEM, OHIO

BLISS
SINCE 1857

Bliss is more than a name... it's a guarantee

Presses, ROLLING MILLS, Special Machinery

PLANTS: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Pittsburgh and Midland, Pennsylvania; San Jose, California
E. W. Bliss (England) Ltd., Derby — E. W. Bliss Co. (Paris), France

Tight coils without surface damage!

1. Red hot 54" strip traveling 1700 fpm is taken up on mandrel of new Bliss downcoiler at Indiana Harbor Works. Note that blocker rolls are retracted, leaving plenty of clearance. Expanded mandrel grips I.D. of coil firmly, maintaining tension on the strip.

2. Blocker rolls move in as trailing end of strip comes through pinch rolls (upper right), at end of run-out table.

3. Eight-thousand-pound coil is easily stripped from the collapsed mandrel segments. Note smooth edges and tight winding. Upender is beginning to transfer coil to conveyor station, where it will be banded and marked with heat number.

AIM to save packaging

Bundling cans with Acme Steel Strapping assures 50% faster assembly, better securement, safer shipments. Idea No. S2-4

The F-1 Strapping machine automatically tensions, cuts and welds Steelstrap for faster production line packaging. Idea No. S4-1.

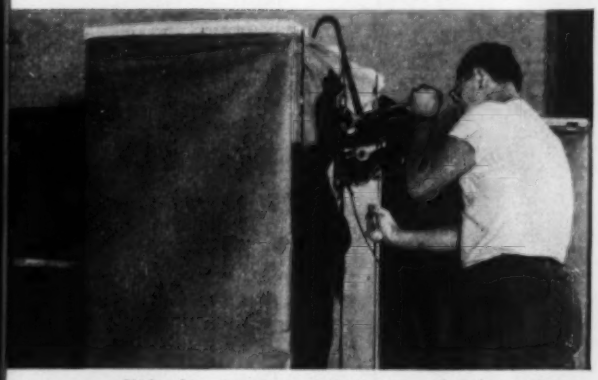
Better securement with steel strapping permits safe, more economical shipment of water heaters. Idea No. U1-1.

To realize more floor storage space, containers are assembled, and wire stitched as needed. Idea No. W1-6.

Fastening motors to wood bases with steel strapping resulted in a 10% saving in time and labor. Idea No. S7-6.

and shipping costs with these

Acme Steel ideas



Skids of paper are protectively wrapped and securely banded with steel strapping for shipment. Idea No. 53-12.

The Acme Steel Silverstitcher speeds carton assembly, gives in-transit protection of tacks and nails. Idea No. W1-2.

Acme Steel Strapping and Stitching ideas like these are but a few of hundreds that could conceivably work profits for you. They assure faster handling, less material expense, better use of warehouse space, better product protection and safe delivery.

Today, perhaps now, an Acme Idea Man is analyzing the packaging, handling and shipping methods of a company somewhere near you. His training, experience and ability to adapt wire stitching and steel strapping methods to your packaging operation are available to you without obligation. Why don't you get a free analysis now. Your Acme Idea Man will observe present methods, demonstrate Acme Steel equipment and recommend the best systems for you. Call him at your nearest Acme Steel office listed in the classified directory. Or send the coupon below for further information.

ask your *Acme Idea Man to help solve your problems

ACME STEEL PRODUCTS DIVISION

ACME STEEL COMPANY

2840 Archer Avenue, Chicago 8, Illinois

These valuable Wire Stitching, Steel Strapping and Unitizing Books are yours free. Each describes scores of profitable cost cutting, time saving ideas made possible through the use of Acme Steel tools, materials and the ingenuity of an Acme Idea Man. Send today!

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Please send the new Acme Steel ☐ Wire Stitching Catalog ☐ Steel Strapping Catalog ☐ Unitizing Book ☐ Have an Acme Idea Man call

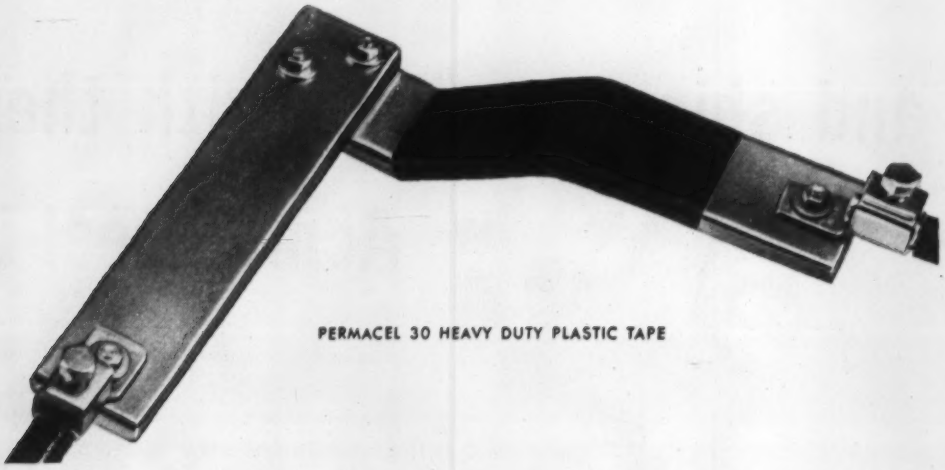
Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

Whatever the job...



PERMACEL 30 HEAVY DUTY PLASTIC TAPE

insulating or identifying

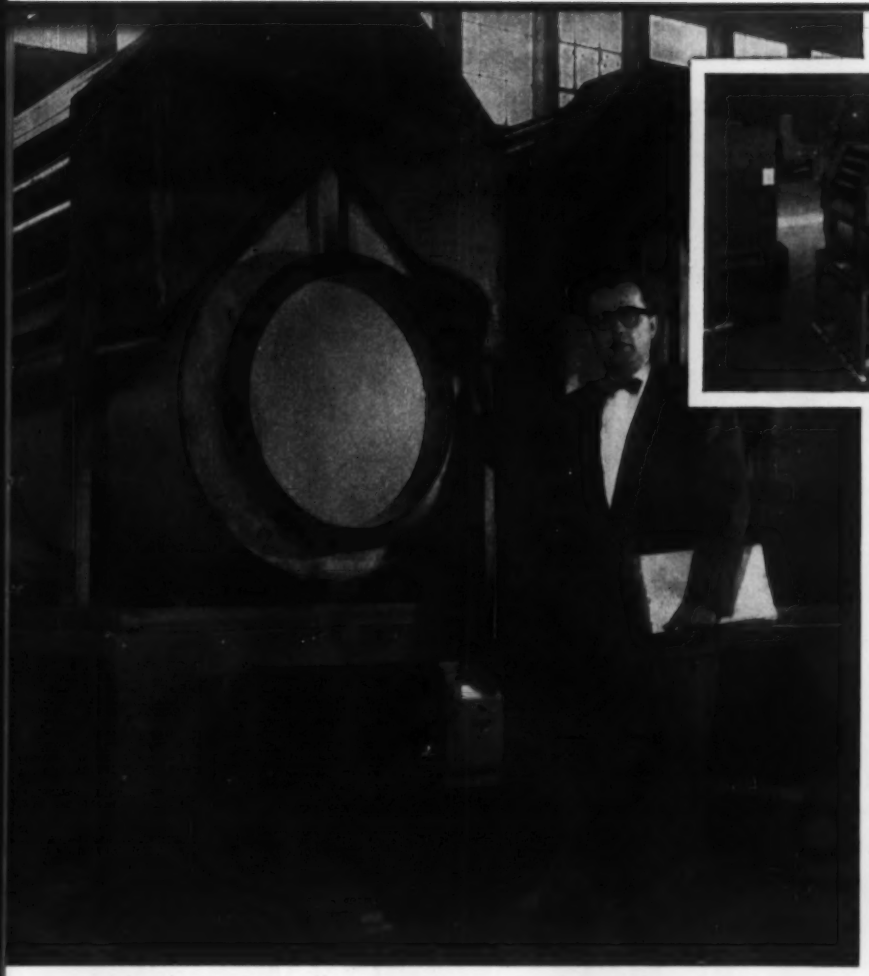
PERMACEL 97 ACETATE FIBRE TAPE

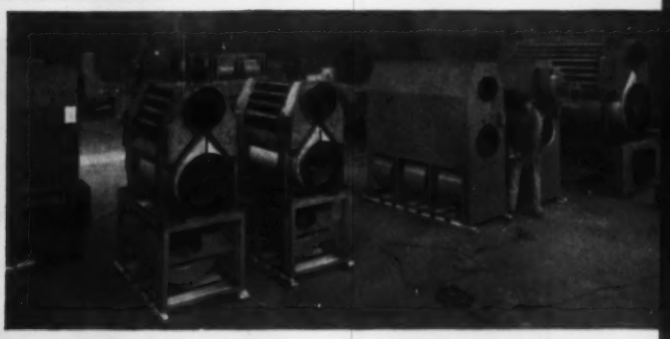
SELF-STICKING

PERMACEL® TAPES

In our complete line, there's a self-sticking tape for every job . . . write Permacel Tape Corporation, New Brunswick, N. J.

a Johnson & Johnson company





Final assembly of the heaters. Teardrop design of the firebox eliminates turbulence, permits entire surface to be wiped by air flow.

Mr. George Costello, Secretary-Treasurer, displays the Stainless Steel firebox for a National Heater.

Firebox is upside down for finish welding. Welders and other workers report no difficulty fabricating the Stainless Steel.

1945: Heater size reduced 25% with Stainless Steel

TODAY: *Increased unit efficiency—increased heater sales*

National Heater Company, St. Paul, Minn., has been making quality industrial heaters for 20 years. In 1945, they looked for a way to reduce the *size* of the units without reducing efficiency.

Primarily, it was a problem of moving the steel firebox walls closer to the flame. But carbon steel would eventually oxidize and lose its shape when brought too close to the flame. So they tried Stainless Steel, and it worked.

The new firebox was made from 14-gauge Stainless Steel. It retained its shape, strength and durability at the elevated temperature. It also eliminated the need for a refractory material.

The new firebox was 25% smaller than the old one. The Stainless Steel has given superb performance, and sales have increased.

There have been no fabricating problems. National Heater uses the same equipment for Stainless Steel that they use for carbon steel.

No other metal combines the corrosion resistance, strength, appearance and easy fabricating properties of Stainless Steel. Keep this remarkable metal in mind when you plan a new design – and for top quality, specify service-tested USS Stainless Steel.

See "THE UNITED STATES STEEL HOUR," Televised alternate weeks. Consult your newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

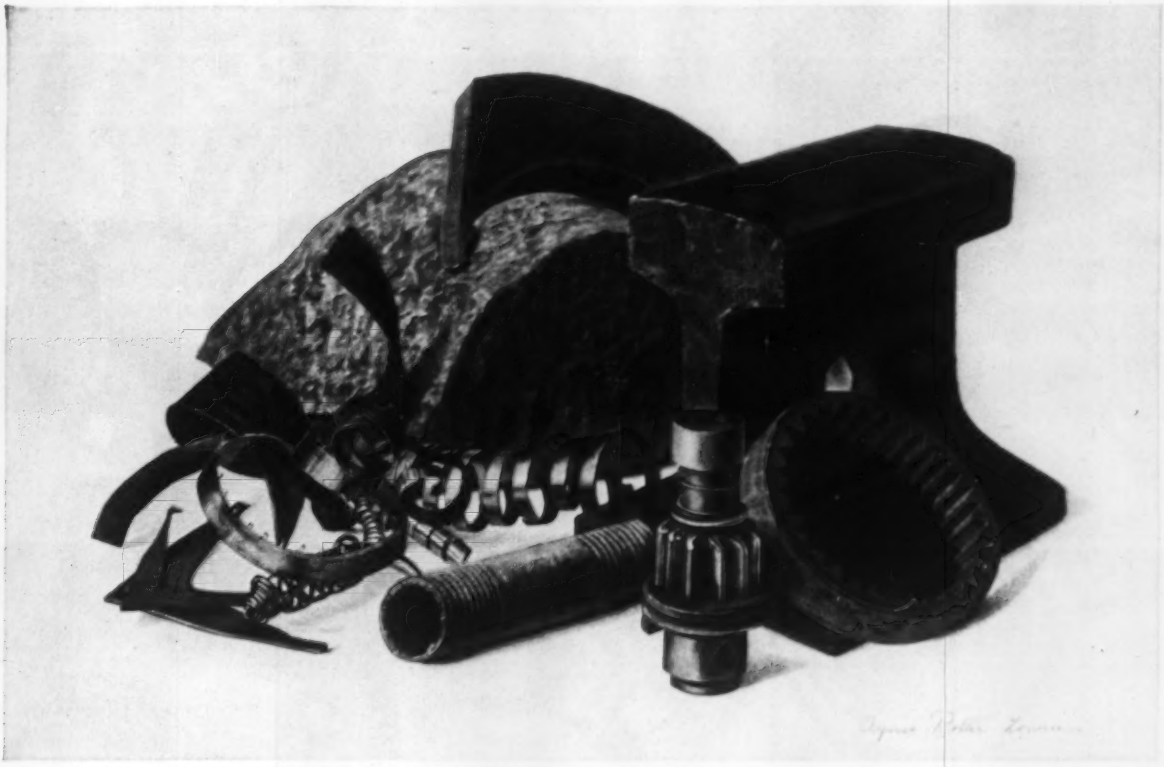
ESTABLISHED 1866

THE WHELAND COMPANY

FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE



"Scrap and Pig for the Furnaces." Agnes Potter Lowrie depicts a variety of objects which will emerge Phoenix-like from the flames of the open hearth to new life as virgin steel: buck-toothed gears, a section of track, machine shop shavings, old tubing, stampings and, bulking equally large, rusty red pig.

The Fine Art of Steel Making

In sharp contrast to many industries, the basic ingredients of steel making have changed little, if any, over the years. How then has steel been able to spearhead America's industrial growth? How has it been able to produce more steel, better quality steel year by year?

Because steel men have worked constantly to improve the *mechanics* of steel making, as well as the metallurgy. And because steel's suppliers have paralleled every such improvement with an equal advance of their own.

Consider the materials which smooth the process of steel making — Ironsides Gear Shield lubricants. Heavy Gear Shield, once hand-paddled onto exposed gears, is now formulated with a solvent for quick spray application.

For encased gears, Gear Shield was produced in liquid form for pouring, pumping or timed-jet application. Later Ironsides was among the leaders in developing extreme pressure lubricants.

Today, so widespread is the acceptance of Ironsides lubricants that other makers have attempted to refer to their own products as "gear shield", even though Gear Shield is an Ironsides trade mark.

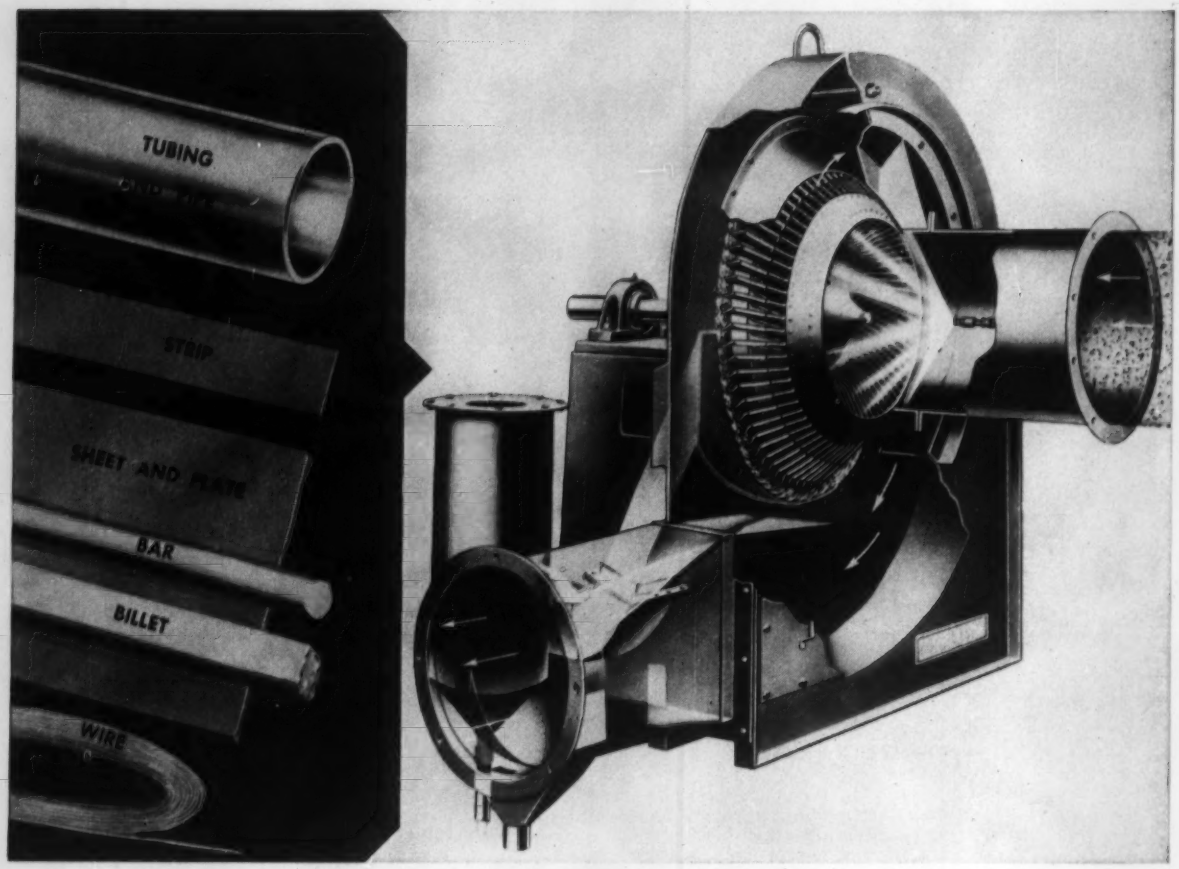
Ironsides is not mass production. We are the "Custom Tailors" of lubrication. Our special position is due in large part to our flexibility. We can — and do — formulate for individual applications and supply these formulas in any quantity from pails to tank cars.

We like tough problems; we've solved a lot of them. For example, Palmoshield, replacement for palm oil and most important advance in lubrication since World War II. If you have a problem, we'd like to help lick it. A letter will summon one of our research engineers. The Ironsides Co., Columbus 16, Ohio.

SHIELD PRODUCTS

Ironsides

By the makers of Palmoshield • "the palm tree that grows in Ohio"



WHEN SEVERE CORROSION IS YOUR PROBLEM . . .

use *Carpenter* Stainless No. 20 and No. 20Cb

TO S-T-R-E-T-C-H EQUIPMENT LIFE . . . CUT COSTS

The super corrosion resistance of Carpenter Stainless No. 20 and No. 20Cb to strong acids, pickling solutions, gases, and other severe corrosives is enabling a fast-growing number of processing plants and equipment manufacturers to greatly increase equipment life, reduce down-time for replacements, and lower corrosion control costs.

For instance, the unique dust handling unit, over 8 ft. high, shown above was made *entirely* of Carpenter Stainless No. 20 and No. 20Cb for a chemical company to provide long-life corrosion and abrasion resistance to dust and vapor containing sulphuric, nitric and hydrofluoric acids, and sodium aluminum sulphate.

These time-saving, cost-cutting super stainless alloys provide extraordinary resistance to sulphuric acid and are completely unaffected by a long list of other strong corrodents. They are available in the form of tubing, pipe, sheet, plate, bars, billets and wire.

For data on corrosion resistance, properties, performance results, uses, and fabrication of Carpenter Stainless No. 20 and No. 20Cb, ask for Bulletin 108A.

If you design, build, or use equipment that must withstand strong corrosive attacks, why take chances on getting satisfactory results with ordinary corrosion-resistant materials? Find out how Carpenter Stainless No. 20 and No. 20Cb can save you time, trouble and money . . . have your nearest Carpenter Distributor or Representative give you the full story.

MEMBER

The Carpenter Steel Company,
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

HOW TO RATE A CUTTING OIL

FOR HIGH PRODUCTION ON TOUGH JOBS

There has never before been a cutting oil selection chart such as Atlantic now offers. It rates oils on job efficiency, not just chemical composition.

This cutting oil chart uses 3 variables to give you the "Cutting Units" which can then be used to select the proper Atlantic Cutting Oil for the job.

Here's what the chart does for you . . .

1 *Provides a* **CUTTING INDEX**—*or rate of metal removal*

2 *Lists* **TOOL MATERIAL**—*by type and composition*

3 *Relates* **METAL** *machinability to both Cutting Index and Tool Material*

4 *Selects proper* **OIL**—*by cross reference of Cutting Units it names the Atlantic Cutting Oil to use*

With Atlantic Cutting Oils, you can maintain high production rates on hot, tough jobs—and without foul odors. Work is visible right through the oil. The oils are compatible when blended—even down to the heaviest grades. Operators like these oils, too, because they don't indelibly stain hands or clothing.

Get complete information on these new oils and your copy of the Atlantic Cutting Oil Selection Chart. Write, wire or phone the nearest Atlantic office. The Atlantic Refining Co., Dept. S-11, 260 South Broad St., Philadelphia 1, Pa.

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430 Hospital Trust Bldg.
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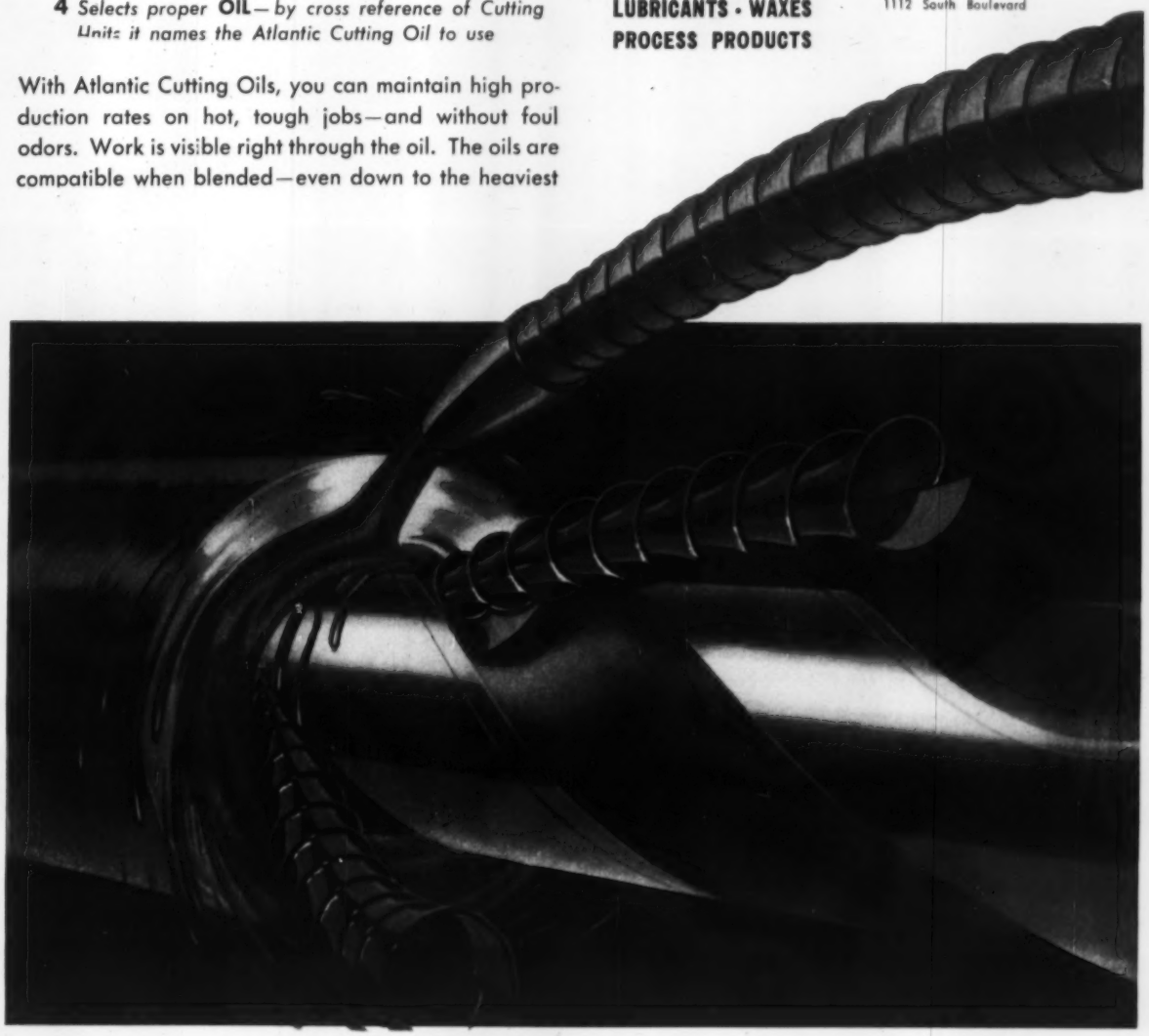
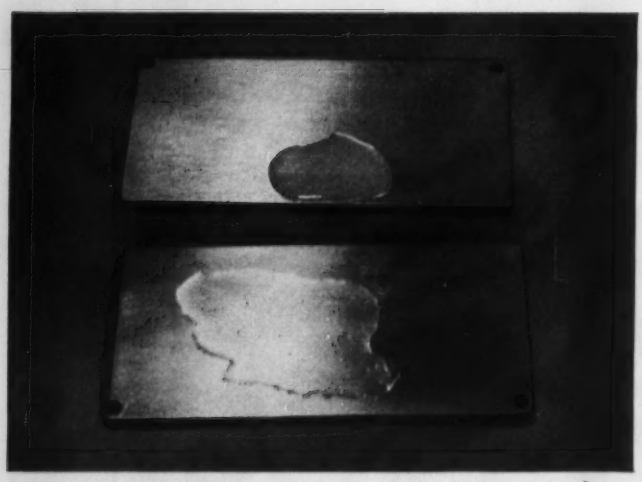
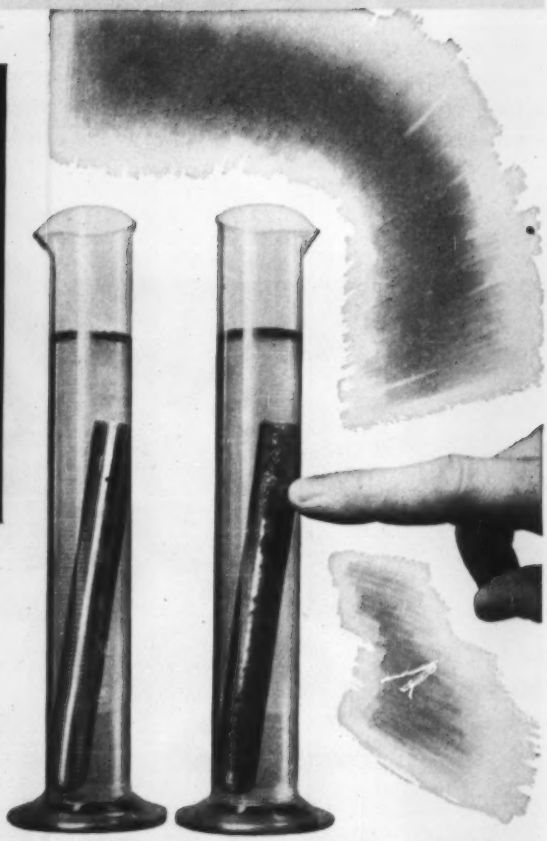
ATLANTIC

LUBRICANTS • WAXES
PROCESS PRODUCTS



Announcing
SHELL
DROMUS OIL E





Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.

Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water *for six months without rusting.*

SHELL DROMUS OIL E

NEW CUTTING OIL

permits higher speeds and faster feeds than ever maintained before

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50%.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, *including cast iron.*

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation.* Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E *on any problem operation you have.* It *is* that good!

SHELL OIL COMPANY

50 West 50th Street, New York 20, New York
100 Bush Street, San Francisco 6, California

SHELL

CHROMIUM ALLOYS

TO MEET YOUR REQUIREMENTS

FOR GREATER STRENGTH

FOR CORROSION RESISTANCE

FOR WEAR RESISTANCE

FOR HIGH TEMPERATURE RESISTANCE

ALLOY	Cr	Si	C	APPLICATION
	PERCENTAGE			
LOW CARBON FERROCHROME	67/71	1.00 max.	.03/2.00	For production of stainless steel, high temperature alloys, and other low carbon alloy steels.
LOW CARBON FERROCHROME-SILICON	37/42	40/45	.05 max.	Used in production of stainless steel to reduce oxidized chrome from slag and also add chromium to the bath.
MEDIUM CARBON FERROCHROME	67/71	2.00 max.	2.25/3.00	Furnace addition for low alloy steels of low to medium carbon content.
FERRO-SILICON CHROME	48/52	25/30	1.25 max.	For simultaneous additions of both Silicon and Chromium to low alloy steels. Readily soluble for either ladle or furnace additions.
STANDARD HIGH CARBON FERRO-CHROME	65/70	2.00 max.	4/6	Standard furnace addition for production of medium and high carbon steel and cast iron.
LOW CHROMIUM HIGH CARBON FERROCHROME	57/64	2.00/4.50	3.50/5.00	Used as charge material in production of stainless steel.
HIGH CARBON FOUNDRY GRADE FERROCHROME	60/66	6/9	4/6	For ladle additions to cast iron. Good solubility.
LOW CARBON FOUNDRY GRADE FERROCHROME	48/52	28/32	1.50 max.	For ladle additions to cast iron to decrease section sensitivity. Excellent solubility.
FERROCHROME BRIQUETS	Cylindrical in shape. Weigh 3½# and contain 2# of chromium. Colored green for easy identification.			Convenient form for adding Chromium to cast iron in the cupola.

DEPENDABILITY · QUALITY · SERVICE

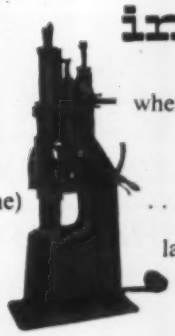
PHILO · TACOMA · BRILLIANT

Ohio Ferro-Alloys Corporation

Canton, Ohio

Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los Angeles

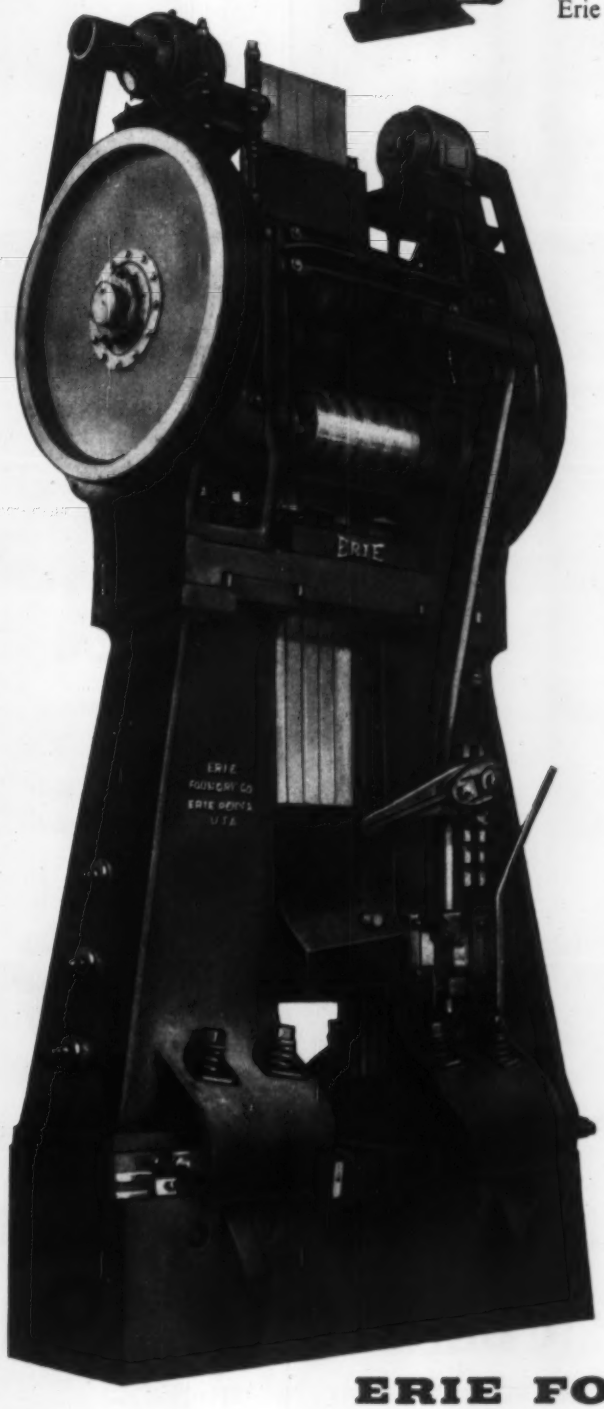
in the good old days



(such as this 100 lb. single frame)

when Erie Foundry was *the first* to use all-steel construction in all our hammers

. . . . . and when hammermen thought a board drop hammer larger than 5,000 lbs. was a wild dream . . . . even then Erie Foundry was a great name in forging hammers



today

Erie Foundry has recently built the world's largest board drop hammer. This 10,000 lb. hammer is at work for Eaton Manufacturing Co's Marion, Ohio forge plant. Eaton is forging 68 lb. net, Flat Back Ring Gears, 16" in diameter, in a single impression die, straight down without blocking or pancaking.

In addition to forging large gears speedily, Eaton likes the Erie 10,000 lb. Board Drop Hammer because the 4-roll lifting head gives longer board life. Air operated board clamps ease the hammerman's job.

As in the good old days, this 10,000 lb. board drop hammer is all-steel . . . and made by Erie.

in our 60th year

ERIE

The Greatest Name in Forging Hammers

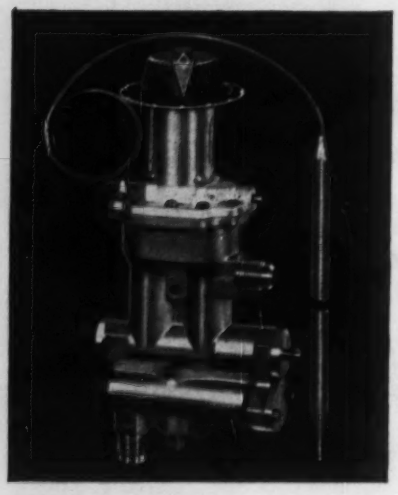
ERIE FOUNDRY CO. ERIE, PA.

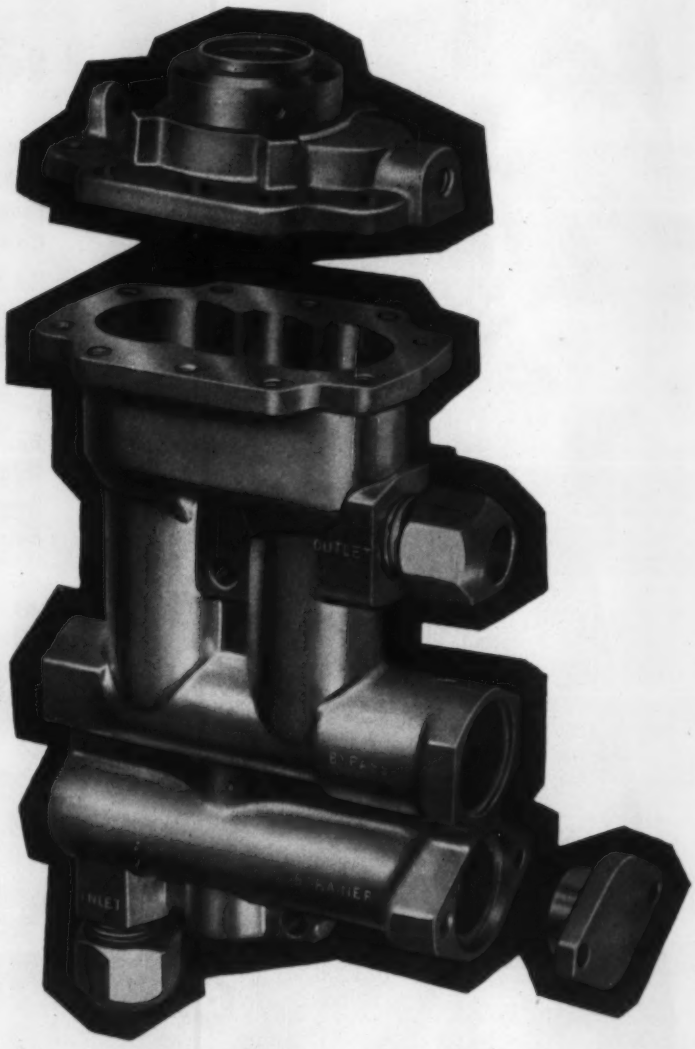
manufacture of

DETROIT SELECTAFLOW CONTROLS

greatly improved by

MUELLER BRASS CO. FORGINGS





One of the finest thermostat control mechanisms for year-around air-conditioning systems is the automatic SELECTAFLOW, a product of the Detroit Controls Corporation. To maintain the high quality of this efficient unit and at the same time speed up and simplify assembly, the body, bonnet and side cover are being forged and completely machined to close tolerances by the Mueller Brass Co. In all, thirty-four machining and finishing operations are performed. This is but one more example of how Mueller Brass Co. machined forgings have improved a product and speeded production. With a wide range of copper-base alloys for forgings, a tremendous background of product engineering, and facilities for precision finish machining, the Mueller Brass Co. can supply machined brass or bronze forgings to *your exact specifications*. It will pay you to consider Mueller Brass Co. forgings for your new or redesigned products. Write us for full color catalog and technical information.

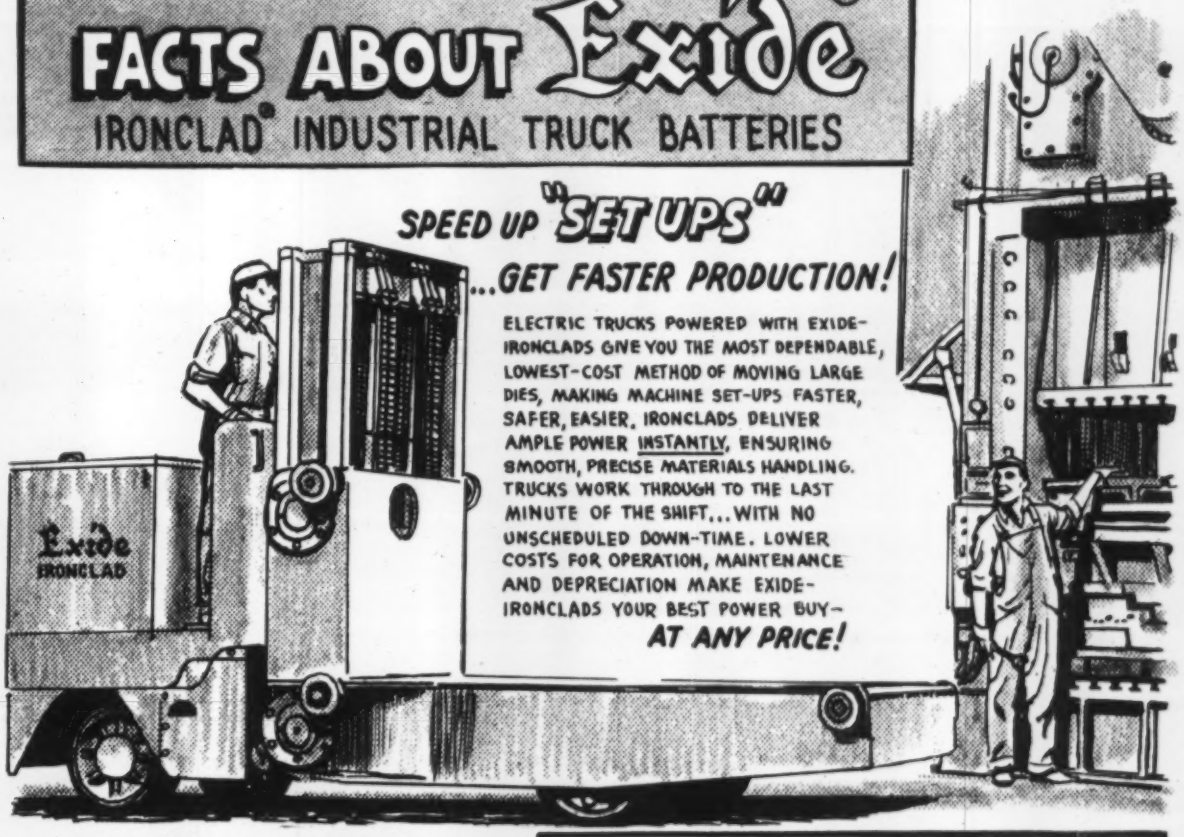
MUELLER BRASS CO. STREAMLINE PRODUCTS

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

FACTS ABOUT Exide®
IRONCLAD® INDUSTRIAL TRUCK BATTERIES

SPEED UP "SET UPS" ...GET FASTER PRODUCTION!



ELECTRIC TRUCKS POWERED WITH EXIDE-IRONCLADS GIVE YOU THE MOST DEPENDABLE, LOWEST-COST METHOD OF MOVING LARGE DIES, MAKING MACHINE SET-UPS FASTER, SAFER, EASIER. IRONCLADS DELIVER AMPLE POWER INSTANTLY, ENSURING SMOOTH, PRECISE MATERIALS HANDLING. TRUCKS WORK THROUGH TO THE LAST MINUTE OF THE SHIFT... WITH NO UNSCHEDULED DOWN-TIME. LOWER COSTS FOR OPERATION, MAINTENANCE AND DEPRECIATION MAKE EXIDE-IRONCLADS YOUR BEST POWER BUY—

AT ANY PRICE!

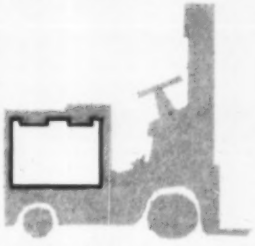
TUBES OF POWER

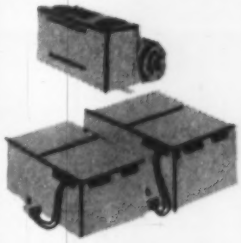
INSIDE EVERY IRONCLAD ARE SLOTTED TUBES THAT KEEP THE ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATES. THE ELECTROLYTE FLOWS EASILY THROUGH THESE NON-CORRODING SLOTS TO REACH MORE ACTIVE MATERIAL FASTER. RESULT: AN IRONCLAD DELIVERS GREATER POWER... FOR A LONGER TIME... AT LOWEST COST!

● PROTECTED SILVIUM CONDUCTING GRID
COMPRESSED ACTIVE MATERIAL
SLOTTED POLYETHYLENE RETAINER TUBE

LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES.

NOW! CASH OUTLAY FOR ELECTRIC TRUCKS CUT DRASTICALLY BY NEW EXIDE PLAN!





BUY ONLY THE TRUCK CHASSIS! CUT INITIAL CAPITAL OUTLAY AS MUCH AS 33⅓%!

LEASE EXIDE-IRONCLAD BATTERIES AND CHARGER!

IN ADDITION TO THE SUPERIOR OPERATION OF ELECTRIC TRUCKS YOU GET BIG ANNUAL SAVINGS. A TYPICAL EXAMPLE OF HOW MUCH YOU SAVE EACH YEAR WITH ELECTRIC TRUCKS AND THE EXIDE PLAN:

1 TRUCK ON 3-SHIFT OPERATION SAVES $1425.76!

MAKE US PROVE THESE SAVINGS! CALL YOUR EXIDE SALES ENGINEER. ASK YOUR ELECTRIC TRUCK SALESMAN. WRITE FOR COMPLETE DETAILS ON THE EXIDE LEASING PLAN!

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

THE 30-FOOT HEARTH IS HERE!
30' 3"

World's largest blast furnace built for Great Lakes Steel

The 30-foot blast furnace has been a more elusive goal to steelmakers than the 4-minute mile to runners and the sound barrier to fliers.

Back in 1918, the steel industry hailed the construction of the first furnace with a 20-foot hearth . . . and set its sights higher. Now, 37 years later, the 30-foot hearth is here.

Proud possessor of the world's largest blast furnace is the Great Lakes Steel Corporation of Detroit, Michigan—a division of National Steel Corporation. Proud designer and erector of this new giant is the Freyn Department of Koppers Engineering and Construction Division.

Great Lakes Steel's new Blast Furnace "A" has a hearth diameter of 30 feet, 3 inches, and a total interior volume of 64,435 cubic feet. This new furnace soars 260 feet above the yard level. Total weight of this mammoth iron-maker, when fully charged, is about 12,800 tons.

Blast Furnace "A" was blown in last June. Engineers predict that, as operating experience develops, the furnace may average 60,000 net tons of iron per month . . . and break the world's record for production.

Designing and constructing blast furnaces is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

KOPPERS®

Engineering and Construction Division

FREYN DEPARTMENT

KOPPERS COMPANY, INC., PITTSBURGH 19, PENNSYLVANIA

Great Lakes Steel's new blast furnace at Zug Island, River Rouge, Michigan. With a hearth diameter of 30 feet, 3 inches, this is the world's largest blast furnace. A realistic pig-iron production target is 60,000 tons monthly.

TRY ONE OF THESE THREE ...and SEE!

Revolutionary, new type abrasive — cut from high-quality alloy steel. Work-hardening — outperforms all others!

Chilled shot and grit — for blast cleaning of large, heavy jobs. Unexcelled for toughness, long life, better cleaning.

Malleable shot and grit — for less severe cleaning and scale removal. The finest malleable shot on the market!

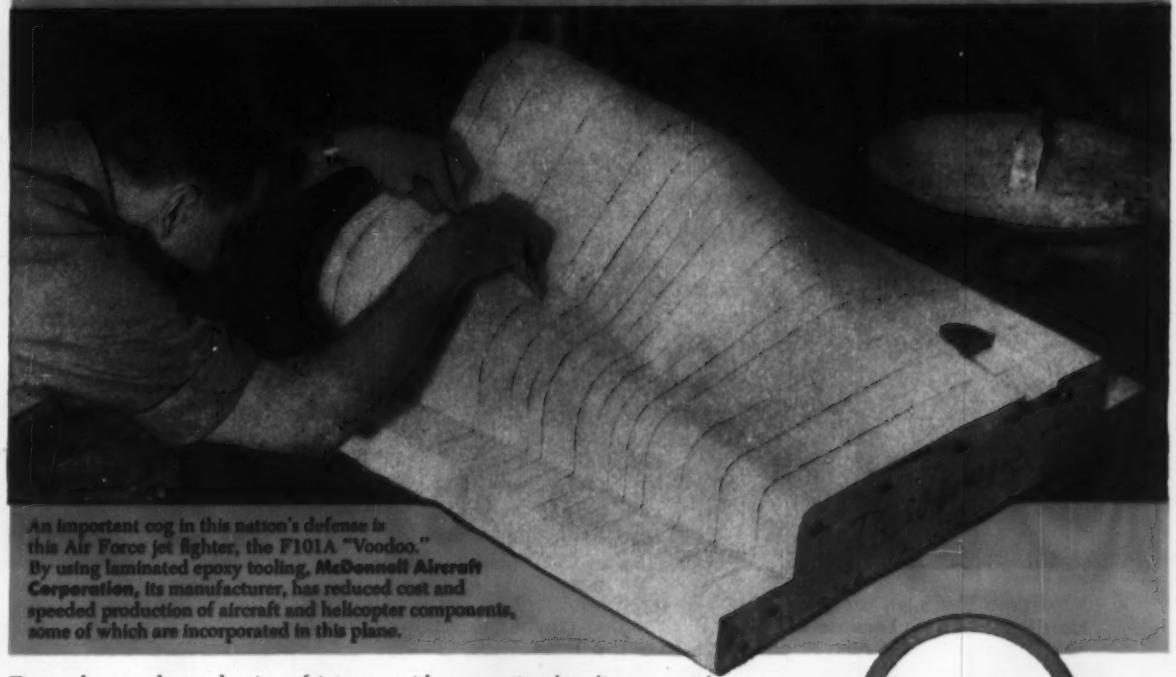
No matter which of METAL BLAST'S three abrasives you choose for your blast-cleaning requirements —you'll get unexcelled efficiency and economy. For these are *good* abrasives—made of top quality materials, on modern equipment, with the greatest of care. If you aren't fully satisfied with the abrasive you're now using, why not try one of these three? Send in your trial order today!

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

THERE'S A **METAL BLAST** ABRASIVE FOR EVERY CLEANING REQUIREMENT

Compounds based on BAKELITE Epoxy Resins cut production costs, tooling time!



An important cog in this nation's defense is this Air Force jet fighter, the F101A "Voodoo." By using laminated epoxy tooling, **McDonnell Aircraft Corporation**, its manufacturer, has reduced cost and speeded production of aircraft and helicopter components, some of which are incorporated in this plane.

Faster, less costly production of interchangeable aircraft components results from the advantages of "Ren" tooling compounds based on BAKELITE Brand Epoxy Resins. For instance:

- Overall savings as high as 40 per cent have resulted where tools are adaptable to plastic.
- Weight of plastic tools is only 25 per cent that of similar steel or kirksite tools, 60 per cent that of aluminum tools.
- Savings in tooling-up time are as much as 40 per cent when compared with conventional tooling materials.
- Up to 75 per cent of all the interchangeable door panels used in one aircraft have been assembled and coordinated with tools made of BAKELITE Epoxy Resin—glass cloth laminates.

Epoxy plastic tooling compounds enabled this aircraft manufacturer to take advantage of the savings cited above. The compounds that are used are a product of **Ren Plastics, Inc.** (formerly Ren-ite Plastics, Inc.), P. O. Box No. 1256, Lansing 4, Mich.

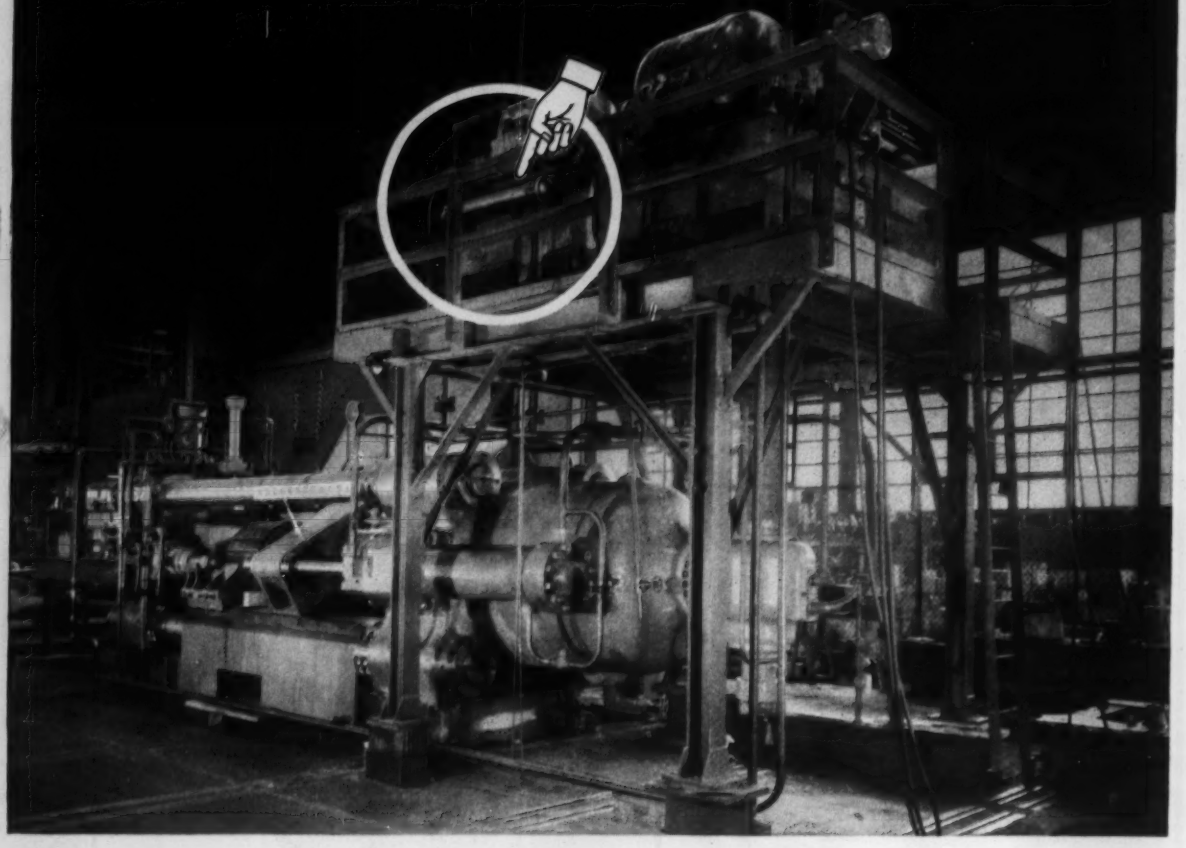
BAKELITE BRAND EPOXY RESINS

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

ROSS EXCHANGER

cools oil to maintain peak capacity of this 2000-ton Lombard extrusion press



Hardly noticeable because it's so neatly installed (thanks to its compactness and convenient connections), a Ross Type BCF Exchanger plays a key role here. It safeguards the rated 2000-ton capacity of this big Lombard Extrusion Press by providing safe, dependable oil cooling *at all times*. Pump slippage from overheated, thinned oil is prevented.

On practically every type and make of hydraulic equipment . . . die casting machines, metal drawing presses, welders, powdered metal presses, plastic molders, stretch wrap formers, broaching machines and fluid drives . . . you'll find Ross Exchangers regularly featured as standard, factory-furnished accessories.

When you see them, it's a sure sign that there's been no compromise in providing reliable temperature protection. That's because Ross Exchangers are not only unequalled for thermal efficiency, but for ruggedness in withstanding punishing hydraulic shock.

Pre-engineered and fully standardized, Ross Type BCF Exchangers are promptly available in a wide range of sizes to meet most needs. For detailed information, request Bulletin 1.1K5.

KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

1431 WEST AVENUE • BUFFALO 13, N. Y.

In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

standard for comparison

...and with high speed steels the standard is REX

Living up to a standard for comparison isn't easy. That's why Crucible lavishes special care on the manufacture of REX® high speed steels... to keep REX the *standard* wherever high speed steels are used—as it has been for over half a century.

It's easy to *prove* the superiority of REX. Use it on the job... check its size, structure, response to heat treatment, fine tool performance. You'll agree with thousands of other users—*you can't find a high speed steel to outperform REX.*

Remember, REX is made only by Crucible. So call for REX at any Crucible warehouse, or for quick mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Furnace additions of ELECTROMET *silicomanganese give you many advantages . . .*

• **Combination Alloy**—In making steel, silicon and manganese are much more effective deoxidizers in combination than when used separately. ELECTROMET silicomanganese is designed for the simultaneous addition of silicon and manganese in the correct proportion.

• **Fast Solubility**—Because of the concentration of active elements in ELECTROMET silicomanganese, less time is required for solution in molten steel than when equivalent amounts of silicon and manganese are added separately.

• **Savings in Furnace Time**—Because of the low carbon content of silicomanganese, the carbon in the bath need not be reduced so much as would otherwise be necessary. This results in a saving in furnace time.

• **Cleaner Steel**—Since silicomanganese has a low carbon content, it is not necessary to drive the carbon as low (or make the oxygen as high) as when standard ferromanganese is used. The final steel is, therefore, cleaner and has better working properties.

CHOICE OF THREE GRADES

You have a choice of three grades of ELECTROMET silicomanganese:

Max. 1.50% Carbon Grade	Manganese	65 to 68%
	Silicon	18 to 20%
Max. 2.00% Carbon Grade	Manganese	65 to 68%
	Silicon	15 to 17.50%
Max. 3.00% Carbon Grade	Manganese	65 to 68%
	Silicon	12 to 14.50%

"ELECTROMET" SERVICE IS AVAILABLE TO YOU

Our metallurgists will be glad to assist you in the application of ELECTROMET silicomanganese to your specific requirements.

For further information please get in touch with the nearest ELECTROMET office.

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit
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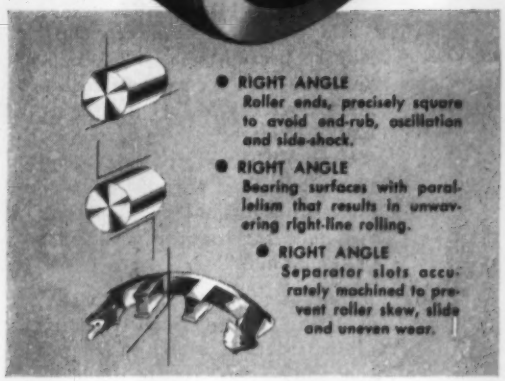
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

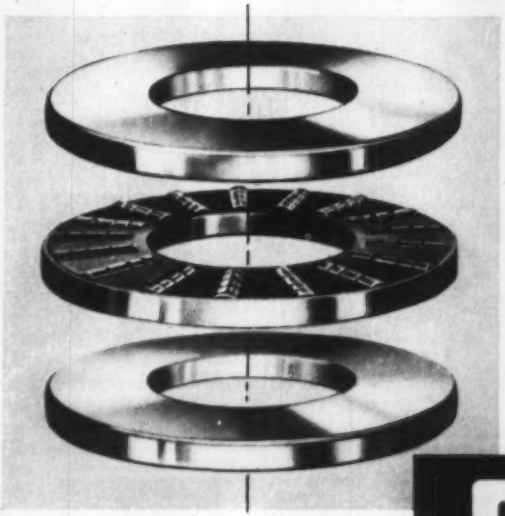
RIGHT ANGLE DESIGN

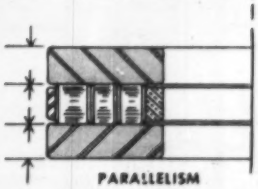
Reduces Maintenance Costs and Shut-Downs


● RIGHT ANGLE
Roller ends, precisely square to avoid end-rub, oscillation and side-shock.
● RIGHT ANGLE
Bearing surfaces with parallelism that results in unwavering right-line rolling.
● RIGHT ANGLE
Separator slots accurately machined to prevent roller skew, slide and uneven wear.

In a Rollway Radial Bearing there's no wedging of the rollers . . . no pinch out . . . far less roller end rub and wear back. Rollway's *Right Angle Design* reduces rubbing friction to a minimum — results in less service attention, longer life expectancy under heavy duty service.

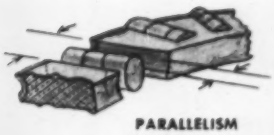
In Thrust Bearing applications, accurate parallelism between the rollers and the matched thrust plates is repeated in the parallelism between the separator slots and the rollers themselves — all adding up to quietness, equalized wear and longer life.





Our complete engineering and metallurgical services will gladly work with you on your problems. Simply write or wire any sales office. No cost, no obligation.

ROLLWAY BEARING CO., Inc.
545 Seymour Street, Syracuse, N. Y.



SALES OFFICES

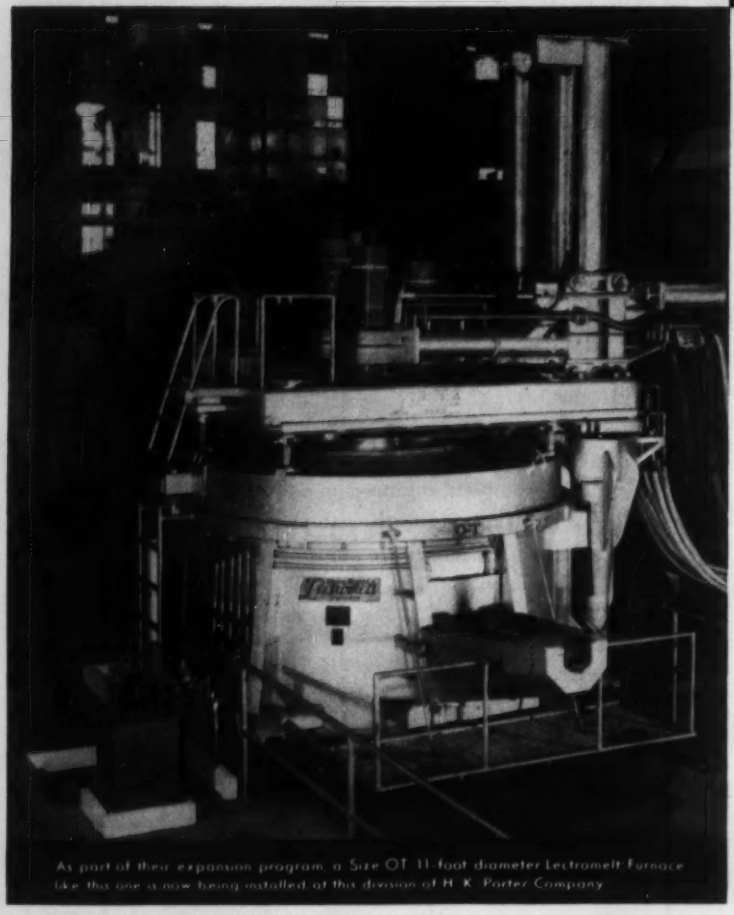
Syracuse, Boston, Chicago, Detroit, Toronto, Pittsburgh, Cleveland, Milwaukee, Seattle, Houston, Philadelphia, Los Angeles, San Francisco.

ROLLWAY BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

Success in producing billet-size ingots with their Lectromelt* Furnaces causes Connors Steel to add another

Stripping billet-size ingots at Connors Steel, Birmingham, Alabama



As part of their expansion program, a Size OT 11-foot diameter Lectromelt Furnace like this one is now being installed at this division of H. K. Porter Company

"We've bought a fourth Lectromelt Furnace because we're 100% satisfied with our three previous Lectromelts", reports Mr. J. B. Reeves, Works Manager for Connors Steel Division, H. K. Porter Co., Inc. of Pittsburgh, Pa. "We cast 4" to 8" billet-size ingots, thereby by-passing any need for soaking pits and a blooming mill."

Billet-size ingots solidify rapidly, resulting in uniformity and fine grain structure. Merchant shapes and reinforcing bars are produced from them now at Connors Steel, with cold finished bars to be added early in 1956.

Lectromelt Furnaces used generally on billet-size ingot work vary widely in capacity, ranging from units making heats of 500 pounds up to 15-ton heats. Of course, other Lectromelt Furnaces in capacities up to 150 tons are regularly used for producing heavy ingots.

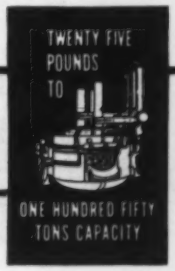
Catalog No. 9-A describes Lectromelt Furnaces for all metal melting and refining work. For a free copy, write Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in... GERMANY: Friedrich Kocks GMBH, Dusseldorf... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF

MOORE RAPID

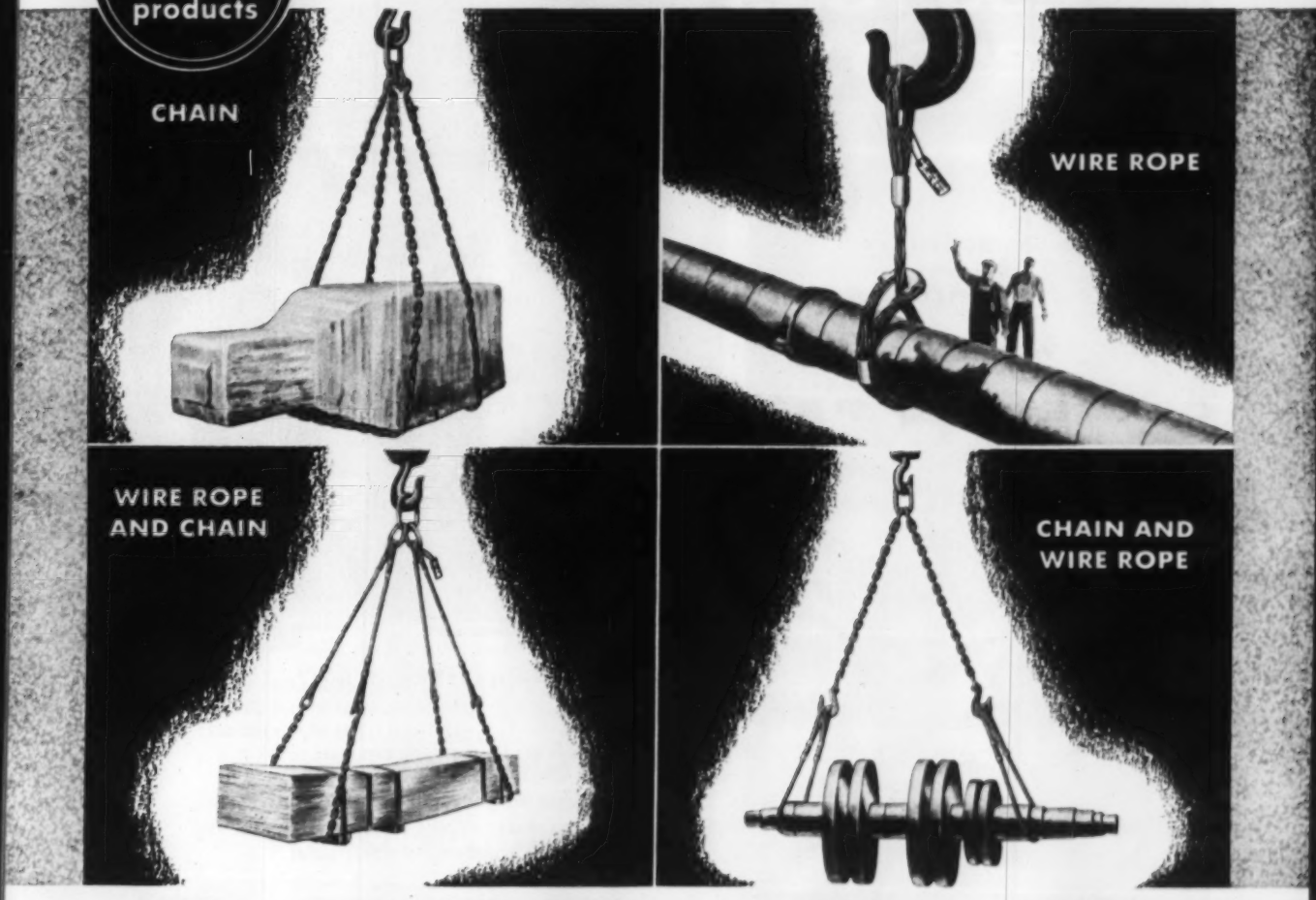
WHEN YOU MELT... *Lectromelt*



ACCO products

ACCO Registered* Slings–Wire Rope & Chain

THE STANDARD OF EFFICIENCY AND SAFETY



Different Loads Require Different Slings

–AND ACCO Registered* HAS THEM ALL!

• The shape or weight of a load, its temperature, protruding sharp corners—all these and other factors should influence the choice of a sling for any particular job. On some jobs chain slings are best. In others the characteristics of wire rope make it the first choice. And in still other cases a combination of wire rope slings and chain slings will provide the greatest lifting efficiency.

The safest slings available

Each component of an ACCO *Registered** Sling is made from the best materials procurable for its use. Each part is first individually tested—it must prove to have strength equal to or greater than the sling body. All hooks for ACCO *Registered** Slings are also Magnaflux tested. Then these components are assembled into slings according to carefully engineered designs that have proved themselves in rigorous field tests.

The completed sling is then individually proof-tested to twice the working load limit. Then and only then, is it awarded the coveted ACCO Registration certificate and the ring or the tag as the case may be.

Compare this quality control, precise manufacturing, and proof testing with the necessarily hit-or-miss methods used in producing "home made" or hand assembled slings. You'll see why ACCO *Registered** Slings are safer.

And ACCO *Registered** Slings cost less in the long run. Their precision design and manufacture insure longer life—cut your overall lifting costs. Your ACCO Representative has the facts. If you don't know who he is, please write our office at Bridgeport, Conn.

**Trade Mark Registered*

Write our Bridgeport Office for helpful literature

ACCO

TRADE MARK

AMERICAN CHAIN & CABLE

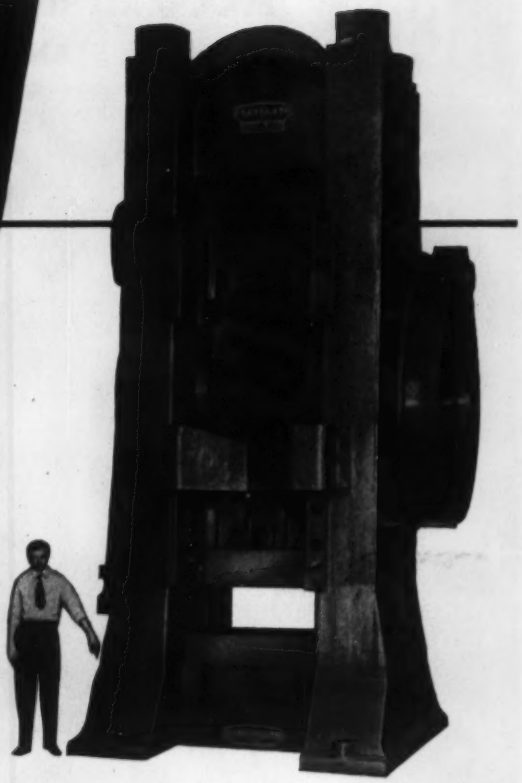
BRIDGEPORT, CONN.

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

for Better Value

250 TONS OR 2500 TONS

Large or small . . .
your stampings cost less
with a
CLEVELAND PRESS!



Cleveland 25K Knuckle Joint Press 2500 tons capacity

Cleveland S1-250-36-42 Straight Sided Single Point Press 250 tons capacity

Each of the 11 specialized types of Cleveland Presses is made in a wide range of sizes. You're sure of getting the exact press to give you utmost production economy.

The construction of all Clevelands is simple and powerful featuring ease of adjustment, minimum wear of moving parts, economy of operation and production accuracy.

You'll find that our patented Cleveland Clutch minimizes costly down-time. It gives you positive, fast control of the slide during all phases of operation. This reduces stamping rejects. What's more its light-weight design requires less horsepower for operation.

Extremely long slide bearing surfaces and rugged frame construction eliminate slide deflection even under maximum load.

These important Cleveland features assure you of lower unit stamping costs. Before you buy your next press won't you let us give you the complete Cleveland story? Just write or call today!

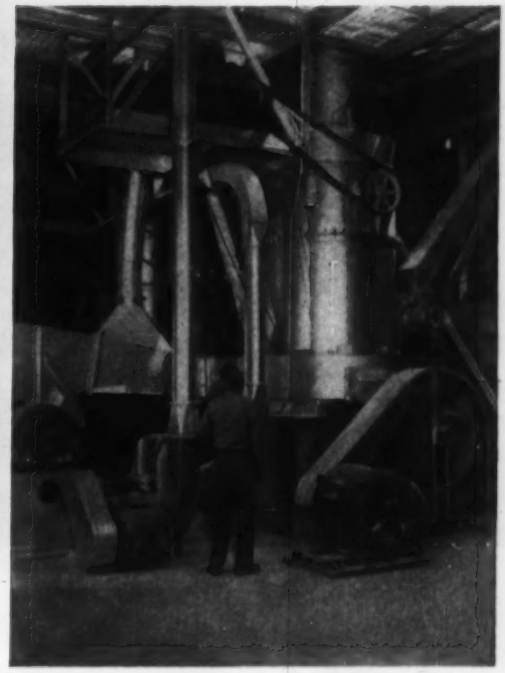
1880 75 1955 YEARS OF CONSTANT PROGRESS
Diamond Anniversary

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES
FABRICATING TOOLS

E. 40TH & ST. CLAIR AVENUE • CLEVELAND 14, OHIO
Offices at: NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING
CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT



• Big pulverizing mills made by Raymond Division, Combustion Engineering, Inc., depend on Johnson Bronze Bearings for trouble-free performance the world over. At right is a high side roller mill installed in the Kaiser Gypsum Wallboard Plant at Seattle.

Where One Bearing Can Keep Whole Plant From Shutdown

When you're investing up to $85,000 for a pulverizing mill around which you're going to build an entire plant, you expect to get equipment which will give long, trouble-free performance.

One leading company in the field of designing and manufacturing pulverizing mills for use all over the world makes every effort to do just that—build sturdy equipment of the best available materials which won't break down because of the failure of any one part.

Because bearings play such an essential role in the operation of pulverizing mills, the Raymond Division, Combustion Engineering, Inc., has relied for more than 30 years on cast bronze bearings made by the Johnson Bronze Company of New Castle, Pa.

Johnson Bronze bearings rate high with this Chicago manufacturer because they can be depended upon to keep these expensive units on the job day in and day out and because they are made just the way Raymond Division specifies. That means a very low rejection rate and faster production.

Take the big bronze bearings Johnson makes for journals on a pulverizing mill. They are made to a tolerance of .002 of an inch. Because Johnson consistently meets this specification, the time required to fit the bearing is held to a minimum. A few taps with a rawhide mallet usually slips the bearing into its position.

If your product demands uniformity, investigate Johnson Bronze products. You can depend on them for faster production and longer life in use. Skilled engineers are available to help you decide what type of bearing you need to get the best possible results at lowest cost. Johnson Bronze Company, 550 S. Mill Street, New Castle, Pa.

Johnson Bearings

LEDALOYL
(powder metallurgy)

ALUMINUM ON STEEL • BRONZE ON STEEL

STEEL AND BABBITT • CAST BRONZE

From 5 days to only 4 hours...

Powder-lancing is the fastest method for piercing steel and many other materials.

Using a powder-lance, it took one man only 12 hours to make a 3 ft. diameter hole in this 2 ft. thick slag pit wall.

Powder-lancing speeds steel mill operations

Once it took 2 men 5 days to chip away four 10 in. diameter risers on ingot molds like the one shown here—but these four risers were removed in only 4 hrs. using a powder-lance.... The removal of 6 in. diameter risers from another mold was speeded from 3 days to only 30 minutes.

In still another operation, a 3 ft. diameter hole was cut through the 2 ft. thick concrete wall of a blast furnace slag pit in only 12 hours. Cost savings were more than 50 per cent over previous methods.

Powder-lancing is the fastest method for piercing holes in concrete, cinder block, fire brick, blast furnace refractories, steel and cast iron containing inclusions, and sand and metal incrustations.

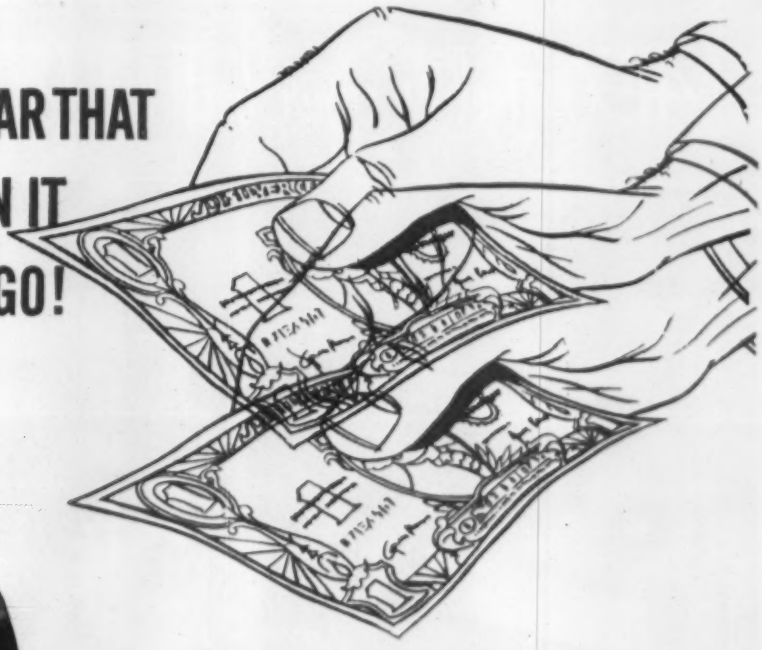
Cut costs, and speed production and maintenance in your mill . . . Call your local LINDE representative for more information on efficient, high speed powder-lancing. Start saving now, call him today.

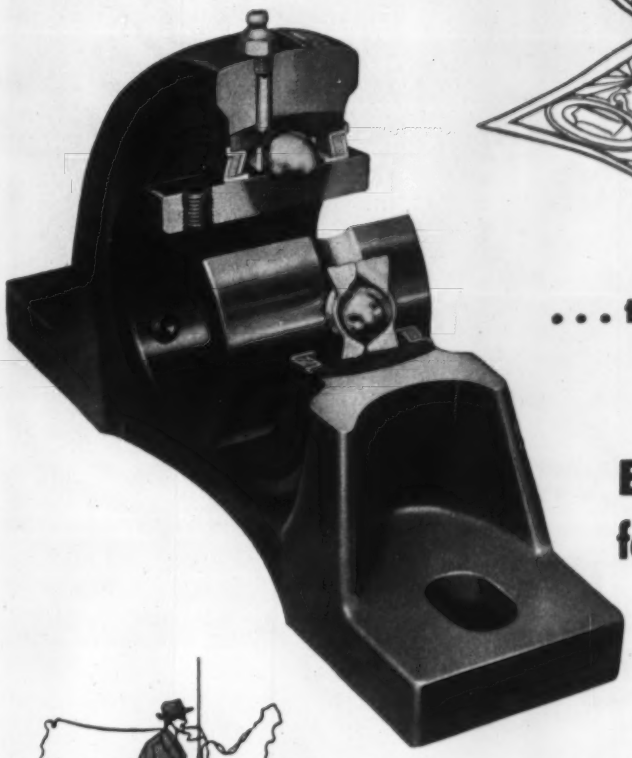
Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

Linde Trade-Mark

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

HERE'S ONE DOLLAR THAT BUYS MORE THAN IT DID 25 YEARS AGO!





Factory Representatives and Dealers Located in All Principal Cities

. . . the dollar you invest in SEALMASTER BALL BEARING UNITS for products you build or buy!

Purchasing power of the dollar may have gone the way of the five cent cigar, but year after year SEALMASTER Bearing Units give you more and more for your component purchasing dollars.

SEALMASTER research and engineering continues to bring you the latest advances in bearing design and manufacture. SEALMASTER Bearing Units contain a combination of patented features you will find in bearing units of no other make.

SEALMASTER has a complete line of bearing units to answer all your requirements for outstanding bearing performance.

SEALMASTER BALL BEARING UNITS

SEALMASTER BEARINGS A DIVISION OF STEPHENS-ADAMSON MFG. CO. • 99 RIDGEWAY AVE., AURORA, ILLINOIS

4150 steel is your best bet for heavy sections

Chromium Molybdenum Steel like AISI-SAE 4150 is the most economical way to uniform properties throughout heavy sections. For heavy duty gears — for shafts — wherever toughness and fatigue strength are important, *plentiful* 4100 Moly steels are better. We will prove it. Climax Molybdenum Company, 500 Fifth Ave., New York 36, N. Y.

AISI-SAE 4150

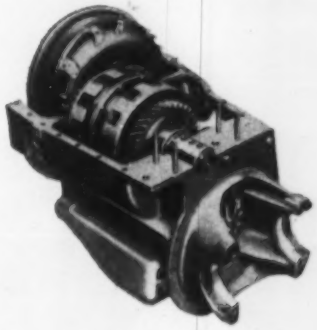
C	Mn	Pmax	Smax
0.48-0.53	0.75-1.00	0.040	0.040
Si	Cr	Mo	
0.20-0.35	0.80-1.10	0.15-0.25	

4100 steels are your best bet

CLIMAX MOLYBDENUM

The smoothest handling lift truck ever built

YALE KGA 51 SERIES



YALE *Torque Transmission*
[FULLY AUTOMATIC]

Specifically designed for the KGA51 Series of Yale Industrial Lift Trucks, the Yale Torque Transmission through torque conversion provides the best all-purpose means of attaining "POWER WHEN NEEDED."

Ease and safety of a modern car . . . automatic response to power demand

with YALE *Torque Transmission*
[FULLY AUTOMATIC]

Automatic Power Control. Engineered exclusively for the KGA51 series, the YALE Torque Transmission matches power to power demand . . . applies the necessary power at the moment it's needed for starting or climbing grades under all load conditions.

Fully Automatic Transmission. Simplified controls increase operator efficiency, reduce fatigue. No clutch pedal or shifting of gears. Only two drive controls—accelerator and directional control lever.

Inching Control. Smoother and more accurate maneuvering of the truck is permitted at times when high engine speeds are required to perform faster lifting or for an attachment operation.

Longer Truck Life. "Cushioned Action" of YALE Torque Transmission reduces vibration and shock loading with less wear on moving parts.

Increased Operator Efficiency. Lowered cowl affords maximum visibility with operator protection. Improved safety and comfort offered by lowered seat.

Versatility. Available in capacities from 3000 to 8000 lbs. . . . Gas, Diesel, or LP-Gas powered . . . cushioned or pneumatic tires.

FREE, FACT-FILLED BOOKLET

This informative color booklet includes cut-away of the KGA51 Truck—shows why this is the smoothest handling lift truck ever built. Write: The Yale & Towne Manufacturing Company, Roosevelt Boulevard, Philadelphia 15, Pa., Dept. 811.

YALE*

INDUSTRIAL LIFT TRUCKS AND HOISTS

*REG. U. S. PAT. OFF.

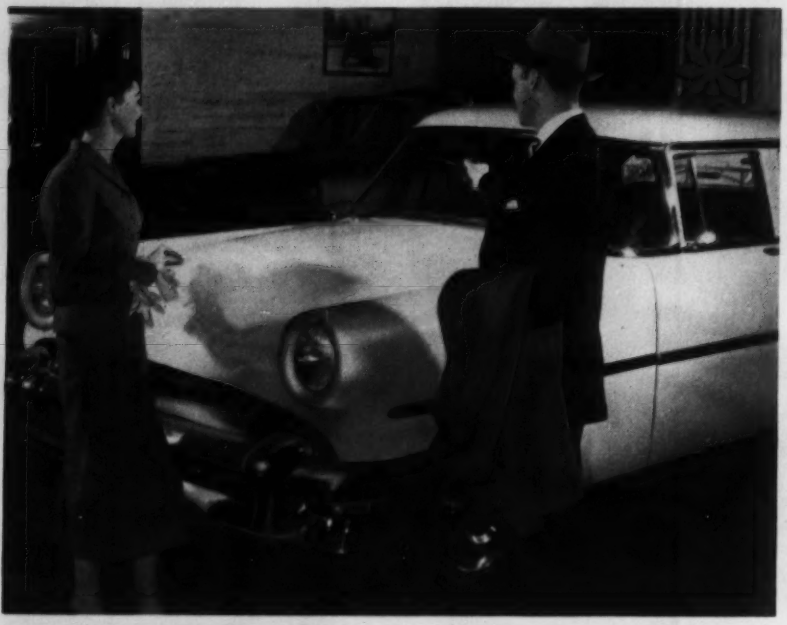
Gas, Electric, Diesel, LP-Gas Industrial Lift Trucks • Worksavers Warehousers • Hand Lift Trucks • Hand and Electric Hoists

CIRCULAR SAWS. Simonds makes all three types — Inserted Tooth, Segmental, and Solid Tooth Saws. A "right" saw for every metal cutting application.

SPEAKING OF NEW CARS

SIMONDS Helps to Reduce the Cost of cars* like this and yours

Few of us could afford new cars like this without the magic of mass production. One of the things that makes mass production possible is the low cost, dependability of Simonds cutting tools and die steels. Simonds quality has long played an important part in the automotive industry. Carefully maintained by 100% quality control from Simonds own Steel Mill through every step of manufacture in Simonds famous "Windowless" plant, Simonds unique quality keeps production lines moving, unit costs down.



HACK SAW BLADES. Simonds "Red End" Hack Saw Blades (Power and Hand) last uniformly longer, cut metal cutting costs.

BAND SAWS. Simonds makes all three types — Regular Tooth, Sabre or Skip Tooth, Spring Temper — to provide the best blade for every application.

FILES. Mechanics report Simonds "Red Tang" Files feel better, file better, last longer — cut more metal per filing dollar. "Prover-tested" for grade A quality.

SQUARING SHEARS. Simonds single edge shear outlasts other types, costs less for shearing thin sheet metal. Made by Simonds exclusive "Tungsweld" method.

DIE STEEL. Simonds 1001 sizes of flat-ground tool and die steel save more time and money in the toolroom — give excellent results on every job.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

For Fast Service from Complete Stocks
Call your
SIMONDS Industrial Supply DISTRIBUTOR

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

U. S. Vulcanite work wheel brings new quality to centerless grinding

This non-porous rubber bonded type wheel will

A Produce superior high finishes (8 down to 4 Micro) on final passes.

B Deliver more pieces per wheel—for greater economy. (Specify A80-R2-R8)

C Resist the dressing action of sharp projections that have a small area of contact. (Specify A80-T3-R8)

These U. S. VULCANITE WORK WHEELS have done the above jobs for many manufacturers—and will provide you with better grinding quality and *reduce your costs.*

EXTRA DIVIDEND: Remember that when you buy wheels from a United States Rubber Company salesman you are dealing *direct* and are being served by a specialist—a man whose only job is selling and *servicing* abrasive wheels. He will see that you get maximum value out of your abrasive wheel dollars.

"U. S." Research perfects it . . .
"U. S." Production builds it . . .
U. S. Industry depends on it

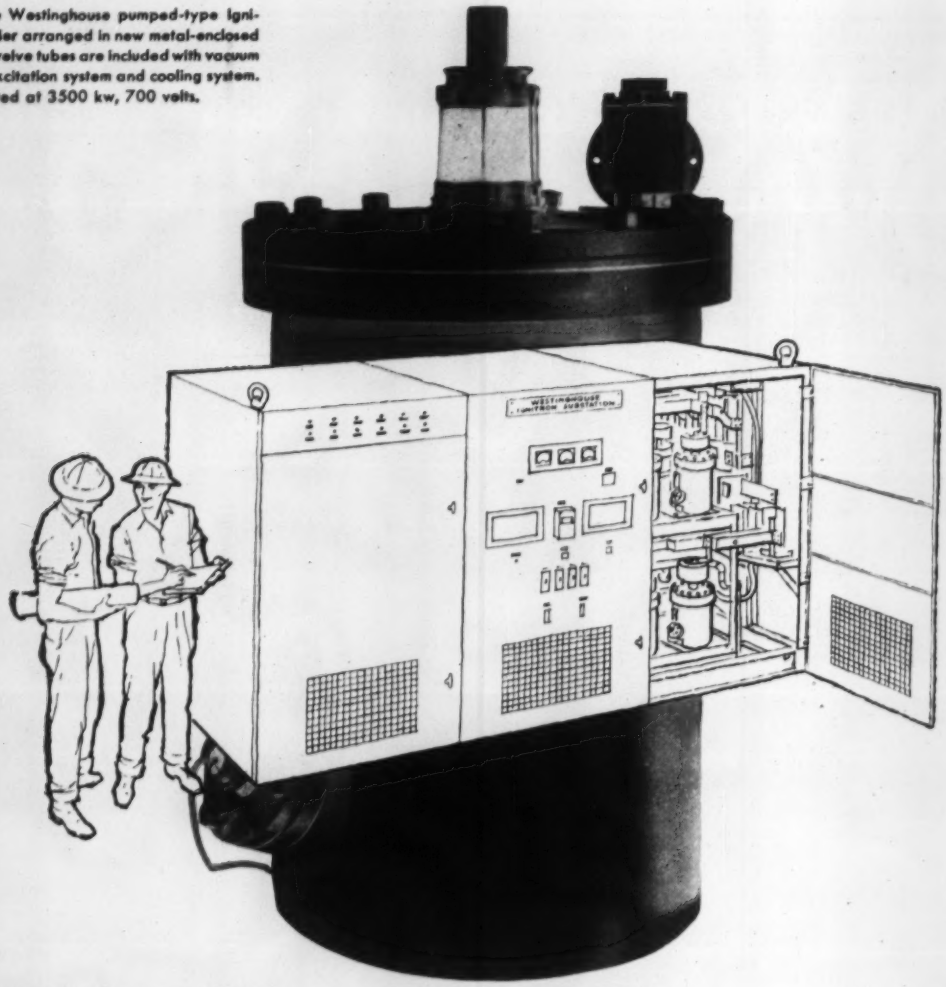
US RUBBER

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

This is the Westinghouse pumped-type Ignitron rectifier arranged in new metal-enclosed design. Twelve tubes are included with vacuum system, excitation system and cooling system. Unit is rated at 3500 kw, 700 volts.



Pumped Ignitron rectifiers now "packaged" for more safety, compactness . . . easier installation

The rectifier with millions of installed kw behind it gives you d-c power with these 5 big advantages.

Complete metal enclosure—This new d-c conversion "package" is completely wired and completely self-contained—giving extra savings in installation cost and time. Easily close coupled to transformer and switchgear.

Always safe—"Dead" front of the metal enclosure is a big extra feature, makes it practical to install in open areas.

Less floor space—Everything has been compacted into a much smaller area—save on plant space and floor area.

Easy to install—Can go in on any reasonably level floor, nothing special needed because of light weight and absence of vibration.

Westinghouse pumped Ignitrons last and last! This conversion package has indefinite life, can be easily serviced in the field. The first pumped Ignitron, installed in 1937, is still performing efficiently!

Call your local Westinghouse sales engineer or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10447

D-C CONVERSION PACKAGES—FOR ALL RANGES—WITH PUMPED OR SEALED IGNITRONS

YOU CAN BE SURE...IF IT'S Westinghouse

Nary a slip 'twixt the job and the disc

PHOTOGRAPHED AT MORRISON STEEL PRODUCTS, INC.

One look at this new Resin Sander Disc by CARBORUNDUM tells you it's no sissy. One trial in your shop *proves* how tough it is. It bites into metal fast...cuts free and cool...stays sharp from start to finish. The rugged all-fibre backing, plus a resin bond with greater holding power, means far more work per disc. The edge holds shape longer, even on your most severe grinding jobs. Resin Sander Discs are designed for both snagging and surfacing operations, come in types and sizes to fit all Disc Sanders.

For a free demonstration of this new cost-cutter, call your CARBORUNDUM Distributor or salesman today. Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

Diamonds are a tool's best friend

Grinding keen edges on cemented carbide cutting tools can be tricky. The material is extremely hard and brittle...easily harmed by excessive heat. CARBORUNDUM's new B-7 Resinoid Bond Diamond Wheels grind unusually free and cool—reduce the danger of checking or cracking the carbide. Less pressure is needed to achieve accurate sizing to close tolerances, and to produce razor-sharp edges. And CARBORUNDUM's Diamond Wheels hold form better, last longer...deliver greatly increased tool life. Ask your CARBORUNDUM Distributor or salesman for free copy of booklet, "Grinding Cemented Carbides," or write The Carborundum Company, Niagara Falls, N. Y. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ont.

Through product quality and application "know-how"

CARBORUNDUM

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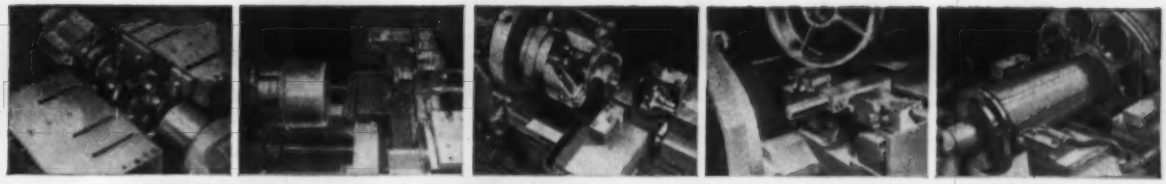
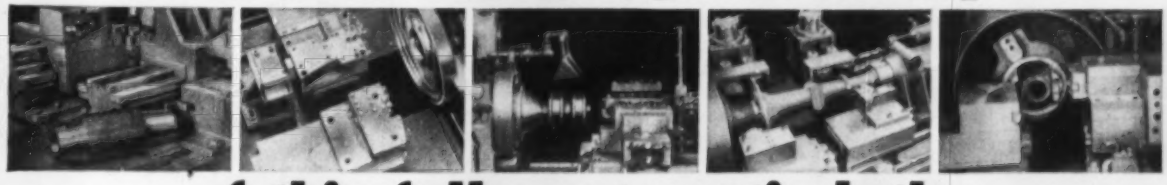
continually puts more sense in your abrasive dollar

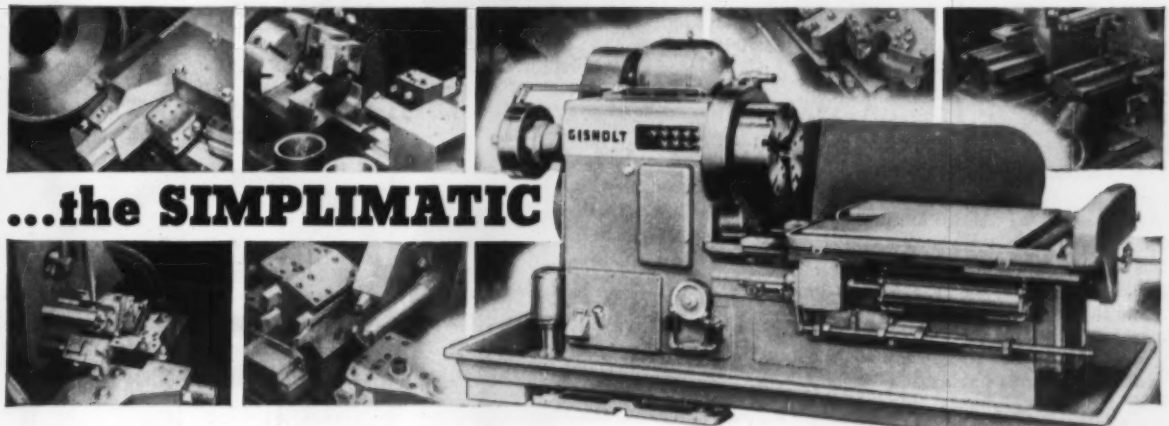


All these different tooling setups

show the amazing versatility



# of this fully automatic lathe



...the SIMPLIMATIC

Here's versatility that beats any automatic lathe you ever saw! Actually, the Simplimatic is doing hundreds of jobs like these—jobs that would otherwise be put on *special* machines—built at extra-special cost. But this (and don't miss the important point!) is a *standard machine*—at a *standard price.*

If you have medium or long runs on parts up to 3 3½" in diameter, get the facts about the Simplimatic Automatic Lathe.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

THIS CATALOG may show you how the Simplimatic can save thousands of dollars for you as it is doing for many others. Write for your copy.

Gisholt Machine Co.
Madison 10, Wisconsin
Gentlemen:

Please send my copy of the Simplimatic Catalog.

Name.....*Title*.....

Company.....

Address.....

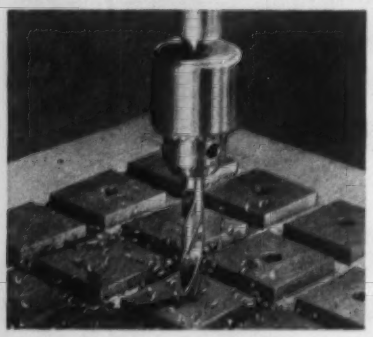
City.....*Zone*....*State*.....

(Advertisement)

WHAT'S NEW
IN STEEL FROM STOCK

Now—Leaded Plates

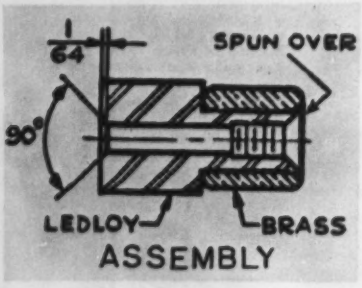
First stocks of leaded steel plates available anywhere are now on hand at Ryerson—and users are reporting results as remarkable as those achieved by thousands of companies with leaded steel bars. Tests show that New E-Z-Cut leaded plates cut faster, take a sounder weld, and polish to a high finish more readily than non-leaded



E-Z-Cut plates. And because sulphur content is much lower New E-Z-Cut is a much cleaner steel, free from troublesome sulphide stringers. First stocks include thicknesses up through 3".

Leaded Bars Make News

Ledloy from Ryerson attracted a good deal of attention at the Chicago Machine Tool Show this fall when three leading machine tool manufacturers chose this amazingly fast-cutting leaded bar steel to demonstrate the efficiency of their latest equipment. For example, the part shown here was machined from Ledloy and assembled with its brass ferrule at a rate of 200 per hour by one tool builder. And at the A.S.M. Show in Philadelphia machining demonstrations showed that the new Ryerson leaded alloy steel Rycut 40 increases tool life up to 300% over non-leaded alloys in the same carbon range. For more details about these demonstrations, and for many other case studies, call Ryerson—where the nation's largest stocks of leaded carbon and alloy steels are available for immediate shipment.



New Fluid Power Tubing

Another development highlighted at the Machine Tool Show is the tremendous increase in hydraulic power applications. And because of this increase, the new Ryerson stocks of light-wall, pump-cylinder finish cold-drawn WELDED tubing should be of interest to a widening group. The special smooth I.D. of this welded tubing often makes it suitable for use "as-is" in place of more expensive types of tubing which still require extra finishing operations. Also in Ryerson stocks for hydraulic applications: Rockrite cylinder finish tubing and hydraulic fluid line tubing.

New Look for Steel Walls

Give steel-walled buildings new beauty with stainless steel siding in mansard pattern, now available for quick shipment from Ryerson. (Galvanized and carbon steel sheets are also available in mansard pattern.) Unusually attractive, economical in total area lost from pattern formation, maintenance-free stainless in mansard pattern also has many industrial and miscellaneous architectural ornamental applications. For new bulletin 70-5, write Ryerson, Box 8000-A, Chicago 80.

Aircraft Steels Specs

Just off the press, a new booklet entitled "Aircraft Steels" contains latest information, in condensed form, on Aeronautical Specifications—Military (MIL), Air Force-Navy (AN), Federal (QQ-S) and AMS aircraft quality steels. Also included is a complete listing of aircraft quality alloy and stainless steels available for quick shipment from Ryerson. To get your copy write Ryerson, Box 8000-A, Chicago 80, for booklet 93.

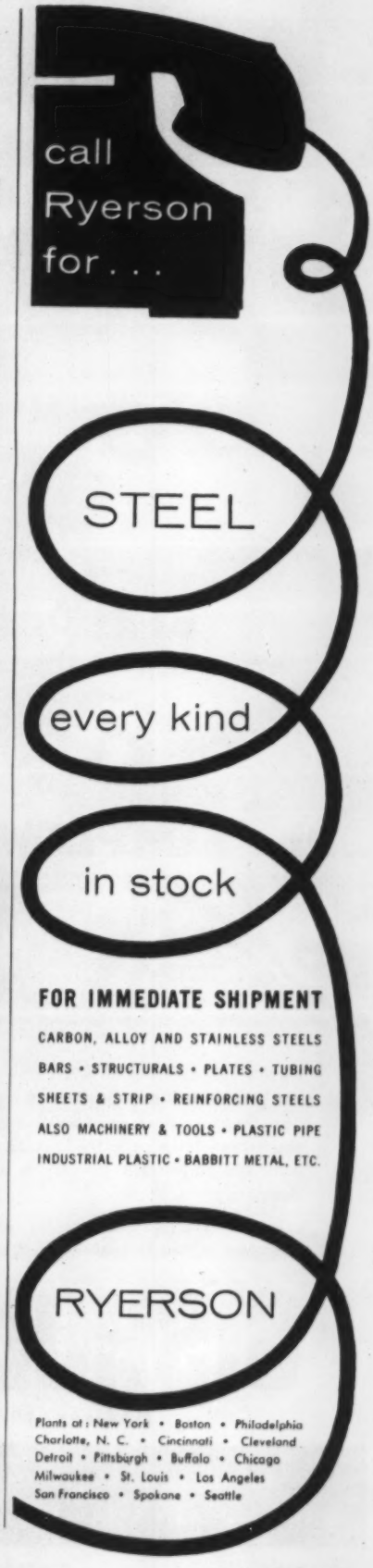
Biggest Stainless Plates

Now available from Ryerson stocks: 96" wide plates in thicknesses up through 1", and heavier plates in 80" widths. Types on hand: 304, 304L, 316, 316L. Save welding on next big job with these larger plates.

Carbon Bars, Plates, Shapes

Heavy demand is keeping supply out of balance from a size standpoint. However, we have thousands of tons of steel on hand and new tonnage being received daily. Ryerson stocks remain the world's largest and most diversified.

Joseph T. Ryerson & Son, Inc.


call
Ryerson
for . . .
STEEL
every kind
in stock
FOR IMMEDIATE SHIPMENT
CARBON, ALLOY AND STAINLESS STEELS
BARS • STRUCTURALS • PLATES • TUBING
SHEETS & STRIP • REINFORCING STEELS
ALSO MACHINERY & TOOLS • PLASTIC PIPE
INDUSTRIAL PLASTIC • BABBITT METAL, ETC.
RYERSON
Plants at: New York • Boston • Philadelphia
Charlotte, N. C. • Cincinnati • Cleveland
Detroit • Pittsburgh • Buffalo • Chicago
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Metalworking Outlook

Discouraging Note

Chrysler Corp. and the independent automakers have experienced a moderate slip in sales percentages since last spring. February, March and April saw Chrysler accounting for nearly 20 per cent of industry registrations. The proportion has dropped to about 15 per cent. Studebaker, Packard and Hudson have suffered similar declines. Nash has done a little better, maintaining its proportion at or near 1.5 per cent of industry registrations since April. Record unit sales for most makes this year obscure the percentage situation.

Ford Makes Gains

Estimated Ford Motor Co. earnings before taxes this year will surpass the aggregate earnings of the company for the entire 21 years before World War II. Ford has boosted its employment in the U.S. to 193,000, up 55 per cent since 1946. Its total wage payments, excluding fringe benefits, will peak at more than $1.1 billion this year. Assets at the end of 1954 totaled $2.1 billion. Its latest expansion plan: A 600,000-sq-ft parts manufacturing plant near Ypsilanti, Mich., slated for completion in 1957.

More Steel Imports?

Even with steel as tight as it is in the U.S., don't look for any marked increase in imports. The supply situation is nearly as short in West Europe and Britain. Tubing and wire imports may be increased moderately from such producers as West Germany. From all reports, Communist-dominated countries are having nothing like the steel shortages we are experiencing.

Russian Profile

A typical Russian atom scientist earns the equivalent of $9000 a year, tax free. He employs a couple of maids, has two cars, good housing and an excellent social position. He's in his 30s and directs six men or so. There's no evidence that he's bludgeoned into working on atom research. Quite the contrary: Because of the material benefits of such a job, the competition for the work is keen. That's a profile drawn by Dr. Ralph E. Lapp, director of Nuclear Science Service, Washington. Last summer he was a delegate to the Geneva conference on peacetime uses of atomic energy.

New Price System

Keep your eye on an unusual steel pricing system being tried by Northeastern Steel Co., Bridgeport. It will tie its hot-rolled strip quotation to the cost of steel scrap. With No. 1 heavy melting scrap ($26.50, brokers' buying price, Boston), as a base for an escalator differential, each dollar

Technical Outlook—p. 129 Market Outlook—p. 183

increase in scrap cost will add $1 to the selling price of hot strip. A 60-day lead time will be used in establishing the price differential. The Boston heavy melting quotation was $37.50 on Nov. 1, $11 over the scrap base, so the January hot-strip price will be $11 per ton over the base price, plus extras. Sales on Nov. 7, when the system starts, are $9 above the base, because the scrap price 60 days ago was $35.50. The system also applies to narrow light gage plate. It won't be applied on production to come from some new steelmaking facilities being built by Northeastern.

Job for Studebaker-Packard?

Studebaker-Packard Corp. may be the third manufacturer of the Pratt & Whitney J-57 engine. The move reportedly will be forced by the Air Force decision to boost output of the B-52 eight-engine bomber, the F-100, the F-101, the F-102 and the F-104 which all use that power plant. Currently, P&W and Ford produce the unit.

On the Fire: Research Grants

Watch for the Pentagon to review its policy on granting research contracts. In July and August, less than 5 per cent of some $187 million awarded by the military departments went to firms having 500 employees or less. The protests from small business champions in Congress are already starting.

Gains in Farm Equipment

Despite farmers' complaints about income and subsidies, farm equipment makers generally are doing much better financially this year than last. But 1954 was a bad year for the industry. Prospects for 1956: Continuing improvement.

Aluminum for Venezuela

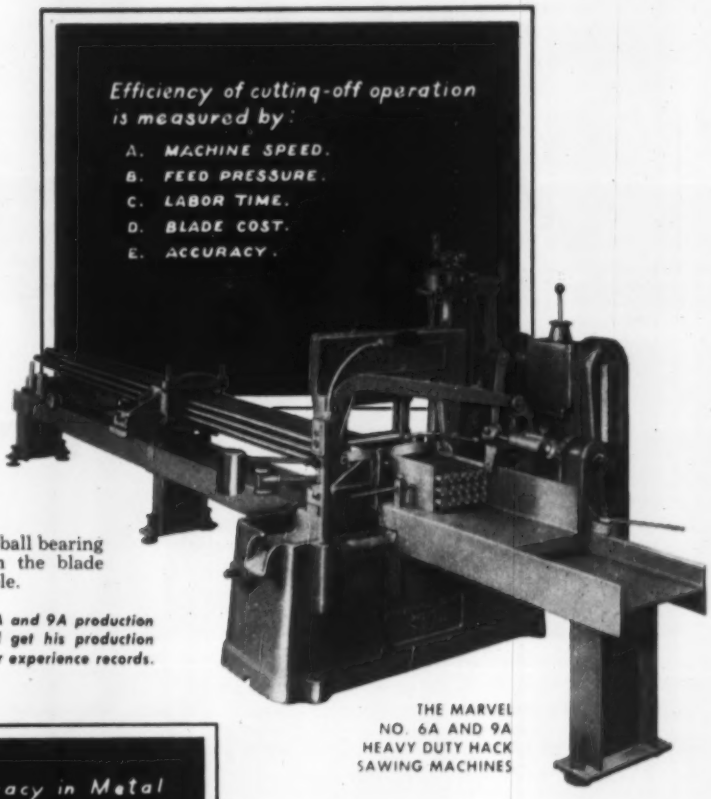
Three American firms and one Canadian aluminum company are considering participation in an aluminum reduction plant proposed for Venezuela. The facility would use electrical energy from a hydroelectric plant planned for the Caroni river. Aluminum Co. of America, Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp. are the U.S. firms interested. Aluminum Co. of Canada is also nibbling.

Straws in the Wind

Form 1120, the new corporate income tax return for 1955, is ready; it's a six-page affair, compared with the old four-page job and is completely revised . . . Look for the Navy two years hence to seek to build nuclear power plants for surface craft . . . Consumer credit hit a record $26.7 billion in September . . . Twenty-three per cent of all installed power generating capacity by 1980 will be atomic, General Electric Co. predicts . . . This week a Senate subcommittee headed by Sen. Joseph C. O'Mahoney (Dem., Wyo.) will "study" whether General Motors Corp. is too big.

Efficiency in Cutting-off is Important

Practically all machining operations start with pieces cut-off from bars or billets. Hence, inefficiency, or lack of capacity, in the cut-off department can hold up or stagnate the entire plant.



THE MARVEL NO. 6A AND 9A HEAVY DUTY HACK SAWING MACHINES

A. Are all-ball-bearing and provide a quick return; therefore they run FASTER than others on the same work.

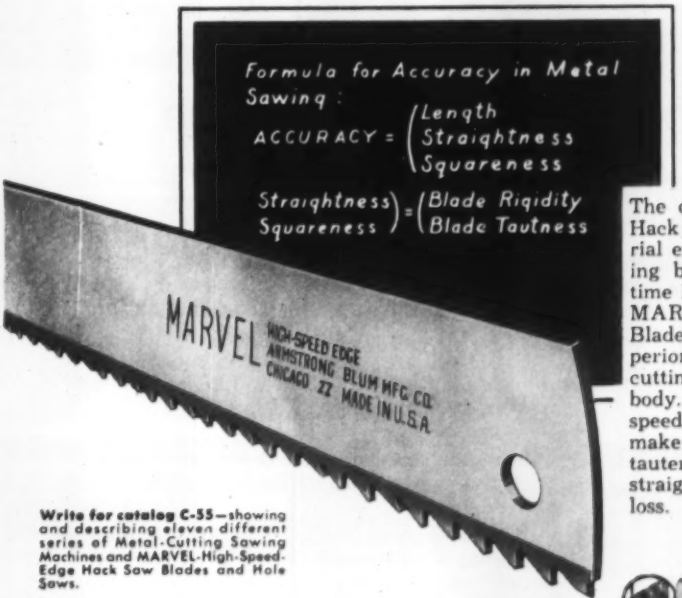
B. Can apply as much as 1200 pounds feed pressure—two to ten times as much as other hack saws and band saws.

C. Are fully automatic, requiring no more operator attention than an automatic screw machine; and set-up for any bar size and cut-off length is extremely simple.

D. Use a non-breakable high speed hack saw blade — the type of saw blade that produces the greatest number of square inches of metal cut per dollar of blade cost—two to ten times (or more) as much as any band saw.

E. Because of their exceptional sturdiness, ball bearing reciprocating frame, ability to tension the blade "truly taut", their accuracy is dependable.

If you are not using modern, improved MARVEL NO. 6A and 9A production hack saws, call the local MARVEL Field Engineer and get his production and cost estimates on your work—to compare with your experience records.


Formula for Accuracy in Metal Sawing:
ACCURACY = (Length, Straightness, Squareness)
(Straightness, Squareness) = (Blade Rigidity, Blade Tautness)
MARVEL
HIGH-SPEED EDGE
ARMSTRONG BLUM MFG. CO.
CHICAGO 22 MADE IN U.S.A.

The composite MARVEL High-Speed-Edge Hack Saw Blade—cuts **any** machinable material efficiently. There is no time lost changing blades for different types of steel; no time lost replacing shattered blades, because MARVEL High-Speed-Edge Hack Saw Blades are positively **unbreakable.** These superior blades have the finest high speed steel cutting edge welded to a strong alloy steel body. They will stand-up under the highest speeds and heaviest feeds attainable on any make hack saw. Can be safely tensioned tauter than any other blade—cut-off not only straight but also square and with less stock loss.

Write for catalog C-55—showing and describing eleven different series of Metal-Cutting Sawing Machines and MARVEL-High-Speed-Edge Hack Saw Blades and Hole Saws.

MARVEL Metal Cutting SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

30,000 lbs. of Nickel Iron in eight "U-ing" dies start the bending of carbon steel sheet into tubular shape for large diameter line pipe. Closing dies require about 50,000 lbs. The Milwaukee plant of A. O. Smith Corp. has produced 400 miles of pipe per month. A plant in Houston, Texas, owned jointly with Armco Steel, can push out 200 miles per month. Both plants make sizes from 8⅝" to 34". Sets of dies contain 8 to 32 nickel iron castings supplied by Lindgren Foundry Co., Batavia, Ill.

Nickel cast iron shapes oil line pipe ...outlasts unalloyed iron dies 5 to 1

400,000 CARBON STEEL SHEETS shaped by a single set of dies in use more than two years . . .

That's how nickel cast iron helps to save money in the production of oil and gas line pipe at A. O. Smith Corporation, Milwaukee, Wisc.

The sheets get their initial lengthwise bend . . . also their press into final cylindrical form...from heat treated 1.50% nickel-chromium-molybdenum cast iron dies.

Wear resistance of these dies contributes two basic advantages: *dimensional accuracy, plus uniformity of finished pipe.*

These advantages cannot be overemphasized . . . even slight variations in size would cause rejections, because line pipe is welded in 40-foot sections at the plant and later the lengths are joined together in the field.

Unalloyed gray iron dies, previously used for shaping pipe, wore rapidly and thus increased rejections.

In contrast . . . the nickel cast iron dies not only reduce rejects, but also give more than five times the service life of the unalloyed type.

Whatever your industry, when you face questions about metal, let us give you the benefit of our wide practical experience. Write for List A of available publications. It includes a simple form that makes it easy for you to outline your problem.

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.

You and the ILO

Even while the teams of smiling Russians absorb American know-how and Big Four ministers pay homage to the Geneva spirit in the Swiss capital, communism continues to pursue its campaign of subtle infiltration.

Its latest approach is through the International Labor Organization created by the Treaty of Versailles in 1919. After the demise of the League of Nations, the ILO continued to function. In 1945, it became an independent affiliate of the United Nations.

As constituted, the ILO is an association of 69 countries. The United States joined in 1934. The U.S.S.R. and seven satellites waited until 1954.

The ILO has a permanent staff of 800, with headquarters in Geneva. Each nation sends four delegates to an annual international conference. Two represent government. Employers and workers have one delegate each.

While the international conference is the supreme authority, work is controlled principally by a governing body of 40—government has 20 representatives, employers, 10, workers, 10. It meets three times a year. To carry on its work, ILO has a 1955 budget of $6.7 million, of which the U. S. pays 25 per cent and the Iron Curtain countries 14.5 per cent. Next year, ILO is getting $12 million.

The purpose of the ILO is to draft international labor standards in the form of conventions or recommendations. Conventions, when ratified, are binding like treaties. The U. S. has ratified seven which deal mostly with maritime employment. Others are pending.

In practice, the ILO has strayed from its original purpose. Under the pretext of helping the workingman, it makes proposals that would force socialism on individual nations. Thirty-two communist representatives in ILO are precipitating a further swing to the left by using the organization as a new medium for the Red propaganda machine.

When the governing body meets this month, there'll be a showdown on whether employer and employee delegates from communist countries really represent free employers and free workers.

If members from those countries are not disqualified, the ILO is likely to become another communist-dominated organization that can have profound effects on world politics in general and on your employee relations in particular.

Place your protest to this threat to U. S. free enterprise with your Senator or Congressman.

Irwin H. Such

EDITOR

But can you be sure it will work as well next month?

When your steel starts with ore from the same mines, reduced to iron in the same blast furnaces, refined to steel in the same open hearth furnaces, rolled on the same mills, by the same men, time after time, order after order . . . you can be certain that your steel is as uniform in quality as the best raw material sources, the finest steelmaking facilities and the most experienced steelworkers can make it.

INLAND STEEL COMPANY
38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul Davenport • St. Louis • Kansas City • Indianapolis Detroit • New York

Principal Products: Sheets • Strip • Structural Shapes • Plates • Bars • Tin Mill Products • Rails and Track Accessories • Coal Chemicals

IRON ORE SUPPLIES for 1970

All Figures in Millions of Gross Tons

POTENTIAL DOMESTIC SUPPLY

	1955	1960	1965	1970
Lake Superior direct ores				
Open-pit	50	30	10	5
Underground	20	20	20	20
Lake Superior concentrates				
Taconite	2	15	20	25
Other	30	35	35	30
Southeastern states				
Direct ore	7	7	7	7
Concentrates	3	3	3	3
Northeastern states	6	6	6	6
Western states				
Direct ore	9	10	13	15
Concentrates	1	2	2	2
By-product ore	1	1	2	2
Total Domestic	**129**	**129**	**118**	**115**

POTENTIAL FOREIGN SUPPLY

	1955	1960	1965	1970
Canada				
Quebec-Labrador	5	15	20	30
Steep Rock	3	5	5	5
Michipicoten	1	2	2	2
Other	1	1	1	1
Latin America				
Brazil	1	2	2	2
Venezuela	6	13	15	20
Other	1	1	1	1
Africa				
Algeria, Tunisia	1	1	1	1
Liberia, Br. West Africa	2	3	4	4
Europe				
Sweden, Norway	2	2	2	2
Total Foreign	**23**	**45**	**53**	**68**
Total Ore Supply	**152**	**174**	**171**	**183**

Source: R. W. Holliday, U. S. Bureau of Mines

Iron Ore Supplies Will Outlast Us

ONLY a Methuselah could expect to see our iron ore supply run out. He lived 969 years.

The iron ore resources in the U. S. alone could supply a steel industry 50 per cent bigger than that of today for 150 years of capacity operations. Foreign countries (including Canada) could add another 80 years of supply at this pace.

A 50 per cent expansion in the steel industry of the U. S. in the next 15 years (see STEEL, Sept. 5, p. 41) will not run aground for want of ore.

Job Ahead—All those reserves are not direct-shipping ores: 65 per cent must come from beneficiation (treatment to make the iron available or concentrated). Beneficiation varies from screening and washing to complex operations such as fine grinding, roasting, magnetic separation and flotation.

Beneficiated materials will be more costly than direct-shipping ores, but that's no stopper. When a material is needed, the consumer will pay the price to get it. This brings out the material.

Higher prices are already bringing out iron-bearing materials (taconite, for instance) that couldn't have been touched a few years ago. Reflecting this incentive, the price of iron ore in the last 15 years has risen 119 per cent—greater than the rate of inflation in our economy. The cost of living, for example, rose 92 per cent in that period.

In the Wind—The price of domestic iron ore will go up on shipments beginning with the 1956 Great Lakes shipping season. Don't be surprised if it's $1 a gross ton. Iron ore producers have to

cover themselves on three wage increases—those of 1954 and 1955, and the one coming in 1956. Because the steel business was slow when the ore producers set prices for 1955, they added only 10 cents a ton—the smallest increase in the last 25 years, and not enough to cover the 1954 wage increase. Since they set the 1955 price, wages have gone up again—in mid-1955. In mid-1956, wages will climb some more.

A $1-a-ton increase is not without precedent. Ore went up that much in the 1949 shipping season. A 50-to-65-cent increase has not been uncommon.

The Make-Up—The sources of iron ore in the U. S., according to R. W. Holliday, commodity-industry analyst for the U. S. Bureau of Mines, are made up like this: 4170 million gross tons of ore over 50 per cent in iron content, 2215 million gross tons with an iron content of 35 to 50 per cent and 61,033 million gross tons with an iron content of 25 to 35 per cent.

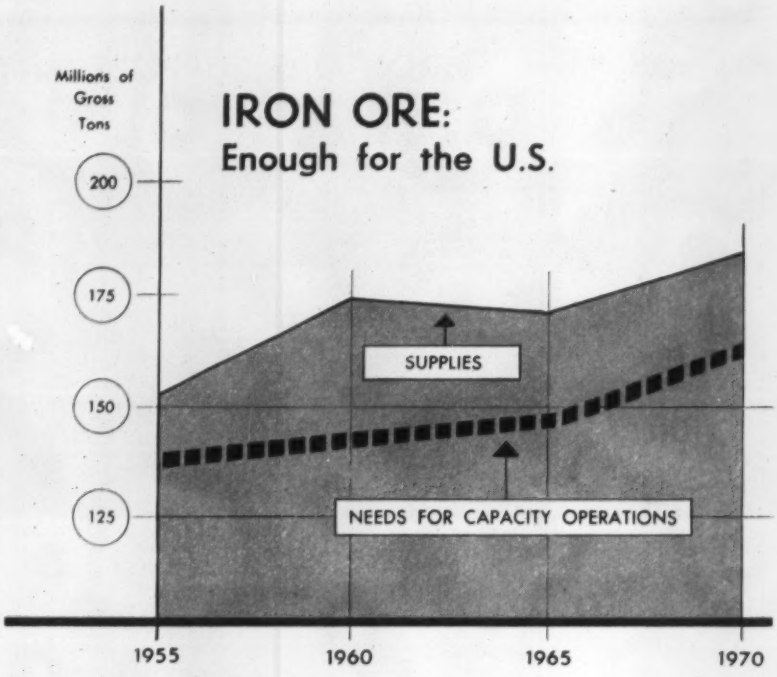
The Lake Superior region still bulks large as a supplier. It has 3605 million tons of the ore over 50 per cent in iron and 60,000 million tons of the ore (taconite) containing 25 to 35 per cent iron.

The next most important U. S. region is the Southeast. Its resources are 105 million tons of ore over 50 per cent in iron content, 1127 million tons in the 35 to 50 per cent group and 1033 million tons in the 25 to 35 per cent bracket.

High Quality—The supply of foreign ores is heavy in the high grades—9595 million tons having more than 50 per cent iron. Others: 7750 million tons of 35 to 50 per cent; 100 million tons of 25 to 35 per cent. Canada is the largest single foreign source. It has 4570 million tons of ore containing more than 50 per cent iron.

As the easily mined iron ores become less plentiful in the U. S., we'll rely more heavily on foreign supplies. Today, 15 per cent of our ore is coming from foreign sources. Mr. Holliday says that figure will jump to 26 per cent in 1960, 31 per cent in 1965 and 37 per cent in 1970. Almost one-half of our imports consistently will be from Canada.

Rivals—The Quebec-Labrador area will be the biggest single Canadian factor. One other foreign area (Venezuela) will rival it. Security considerations favor Canadian ore, but year-round operation and premium grade favor Venezuela. Other foreign sources will include Brazil, Liberia and British West Africa, Algeria and Tunisia, Sweden and Norway.



Sources: Supplies, by R. W. Holliday, U. S. Bureau of Mines
Needs, by STEEL

The Lake Superior region of the U. S. will continue to be the single biggest source of iron-bearing minerals, even though the easily obtained open-pit ores are diminishing.

Changing Patterns—Direct-shipping ores—now accounting for 70 per cent of the domestic Lake Superior supply—will decline to 30 per cent by 1970. Seventy per cent of the direct-shipping ores are now in open pits. The remainder is underground. By 1970, only 20 per cent will be in open pits, 80 per cent underground.

The rest of the domestic supplies in the Lake Superior region are concentrates. Now 30 per cent of shipments, they will account for 70 per cent by 1970. With taconites just getting a foothold, almost all the concentrates now are from lean ores. While they will hold their own tonnagewise, they will decrease percentagewise as taconites develop. By 1970, taconites will account for 55 per cent of the dometsic Lake Superior concentrates.

Another Incentive—As supplies of direct-shipping ores run lower, beneficiated material comes more and more into the picture. But that isn't the sole stimulus to beneficiation. Operators of blast furnaces want to increase the efficiency of their stacks. One way to do this is to use iron-bearing materials that have been upgraded.

With a 60-per-cent iron material instead of a 50, furnace output can be increased 20 per cent. Four furnaces can do the work of five. That's important, for a blast furnace costs $10 million to $12 million. Auxiliary facilities, such as coke ovens and materials handling equipment, can add another $16 million.

Reducing the Needs—Beneficiation of iron-bearing materials will lower the ratio of tonnage needed per ton of steel output. For every net ton of steel ingots produced, 1.2 net tons of iron ore are being used. A 20-per-cent increase in

Bucyrus-Erie Co.

No stone is left unturned in the search for iron ore. The Morton mine (operated on the Mesabi by the M. A. Hanna Co.) is being converted from an underground to an open pit operation. Inactive many years because of quicksand seepage, the property is yielding much-needed ore that couldn't be mined profitably by conventional methods. A walking dragline strips the overburden to an average depth of 190 feet to uncover ore. Concrete shaft (center) is a relic of the underground mine

iron content of ore through beneficiation would lower the ratio to 1 net ton of ore for 1 net ton of raw steel.

This upgrading will not be achieved at once, but over the next five years considerable strides will be made. At the end of the next ten years it's entirely possible that most of the iron-bearing materials charged into blast furnaces will have a 60-per-cent iron content, thanks to beneficiation.

Search Is On—The taconite projects have stolen the show in beneficiation, but many other studies are going on. One is a joint project of Republic Steel Corp., Cleveland, and National Lead Co., New York, to upgrade southern iron ore and iron-bearing materials. A large-scale pilot plant was built last year at Republic's Spaulding iron ore mine near Birmingham, where production scale studies of the contemplated upgrading project are being made. The iron ore concentrate is expected to be upgraded sufficiently to warrant its use in blast furnaces.

National Lead has broad experience in the treatment of nonferrous ores, supplemented by extensive research in Norway during the last nine years. Republic's experience runs from southern iron ore to the beneficiation and use of low-iron content southern nonmagnetic materials.

Atom May Help—Use of atomic energy is one of the hopes of those studying beneficiation of low-grade, iron-bearing materials. When Dr. Robert P. Peterson, a nuclear physicist, joined Republic Steel Corp. a year and a half ago, he said: "It is within the realm of possibilities that by producing heat from a reactor at the source of low-grade ores, atomic energy may play an important part in the economic concentration of low-grade iron ores. This is a new field, but it is one in which there may be great promise."

The quest for iron-bearing minerals will continue as long as we have an expanding population and a rising standard of living. Both increase our use of steel. This means we have to add to our steel in use. We can do so only by extracting it from mineral sources.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Boosting Rare Metals Output

Fansteel Metallurgical Corp., North Chicago, Ill., will spend $1 million on an expansion of tantalum and columbium production.

Dr. Frank H. Driggs, president, said that about $200,000 is to be spent on new buildings and alteration of existing ones. The balance will go for chemical processing equipment, electric furnace equipment and electrical switchgear.

Coke Making Capacity Rises

Wilputte Coke Oven Division, Allied Chemical & Dye Corp., New York, has been awarded a contract by United States Steel Corp. for the design and construction of 192 by-product coke ovens (three batteries) and auxiliary equipment at Clairton, Pa. Wilputte is completing an identical installation there.

McKee To Build Sinter Plant

One of the nation's largest iron ore sintering plants is scheduled for the Fairless Works of U. S. Steel Corp. in Morrisville, Pa.

The plant will be built by Arthur G. McKee & Co., Cleveland. Its cost is estimated at $6 million.

It will be the third best peacetime year as . . .

1955 Ore Shipments Rise

LAKE SUPERIOR iron ore shippers with their season nearly over are looking forward to an equally good year in 1956.

This year they expect shipments will total between 85 million and 86 million gross tons. For next year, predictions range from 80 million to 90 million tons.

Forecast—Here's the way one industry leader sees the situation: The 85 million tons shipped in the 1955 season will be more than matched by the consumption of 90 million tons of Lake Superior ore from Apr. 1, 1955, to Apr. 1, 1956. Lake shippers will start next year in an enviable position. Stocks at Lake Erie docks and U. S. and Canadian mills will hit a low point of about 15 million tons in the spring.

No shortages of any grades of ore are expected if shipping starts by Apr. 15. And the ore fleets don't expect to lose any time in getting started next year.

Changes — Lake Superior ore shipments this year will be about 25 million gross tons over last year's but 11 million under 1953's record.

Production of steel this year probably will exceed by 4 million net tons the record 111.6 million tons made in 1953.

Increasing imports of foreign ore (see page 87) have taken the edge off the demand for Lake Superior material. About 9 million more tons of ore will be imported this year than in 1953. Imports will be up about 5 million tons over last year.

Ore shipments in the future will depend on steel operations and the speed with which foreign ore becomes available. Don't expect the Lake Superior region to again ship 99 million tons (including rail and Canadian shipments) as it did in 1953 unless there's an extreme emergency.

Better Ore—With taconite shipments containing better than 58 per cent iron, deliveries can be smaller and still produce the same amount of steel. The percentage of beneficiated ore was 3.4 per cent higher in 1954 than in 1953. This trend seems to be continuing.

All-rail freight from the Mesabi has been affected by the trend to foreign ore. This winter, few rail shipments will be needed to supplement lake transport. Total rail shipments will be about 2¾-million tons, more than last year but less than any year from 1950 through 1953.

Evidence of the increasing use of foreign ore: The *SS Bertha Entz* unloads 20,895 tons of Labrador ore at a Philadelphia pier. Time taken: Less than 9 hours

Alan Wood Orders Equipment

Alan Wood Steel Co., Conshohocken, Pa., will install a 4-high temper mill for its cold rolled department. A new pinwheel-type coiler was ordered recently for its hot-strip mill. Both orders were placed with United Engineering & Foundry Co., Pittsburgh.

The two installations will cost more than $2 million and are part of the second phase of the expansion and modernization program at the Ivy Rock, Pa., plant. The first phase cost more than $45 million in new equipment and buildings during the post World War II period.

Bliss To Make Voss Levelers

E. W. Bliss Co.'s Rolling Mill Division, Salem, O., is building a unique type of leveler for flattening sheet, strip and plate steel and nonferrous materials through a special arrangement with the Voss Engineering Co., Pittsburgh. It produces commercial flatness with the high speed characteristics of conventional roller levelers. The Voss machine relies on a set of long, slender, individually driven work rolls supported by a lattice of short, heavy back-up rollers. These can be precisely adjusted in any direction, either in groups or as a whole. Bliss also will build the Voss chain roller leveler.

To Boost Plastic Pipe Output

Production of plastic pipe by Republic Steel Corp. will be doubled within the next few months. Facilities are being installed in the Cleveland plant of its Pressed Steel Division to produce a wide range of plastic tubular products.

Armco builds new blast furnaces at Middletown, O.

Three More Expansions

New steel company programs keep coming through. Some of the latest: Inland, Wheeling and Carpenter. These three companies will spend $334 million before 1960

INLAND Steel Co., Chicago, Wheeling Steel Corp., W. Va., and Carpenter Steel Co., Reading, Pa., have announced expansion programs. All will be complete by 1960. Total cost: Some $334 million.

Inland's plans are centered on a three-year expansion of the basic steel plant at East Chicago, Ind. Capacity will be increased by 15 per cent, to 6 million tons of ingots a year by 1959. Three new 315-ton, open hearths will provide most of the gain; the remainder will come from improvements to existing furnaces and operating techniques.

Ready for More—Inland's expansion also includes a new blooming mill. Initially, it will handle 1.8 million tons of ingots a year, but it can be equipped for more than 4.7 million tons. A new cold rolling department will be built. By 1959, this will add some 50 per cent to Inland's production of cold-rolled sheet. With auxiliary facilities, its capacity can be built up to 790,000 tons of cold-rolled products each year (see page 115 for more news from Inland).

Wheeling's program will cost $65 million. John L. Neudoerfer, president, says that many of the plans are still in the engineering stage, and that estimates of the amount to be added to ingot capacity are not available. Mr. Neudoerfer says the expansion will be pushed as fast as possible. Though he notes that steel mill equipment builders are unusually busy, he expects the program to be completed within "two or three years."

Detail—Additional steelmaking facilities will be put in to supplement Wheeling's open hearths. The company's two bessemer converters eventually will be replaced. Capacity increases also will be made in the hot strip and cold rolling departments, both of which are to be modernized. Improvements will be made in the skelp and pipe mills at Benwood, W. Va.

Carpenter Steel's immediate plans include a large hydraulic forging press and an electric furnace, both of which are for delivery early next year. The new furnace will increase the company's melting capacity 20 per cent. High speed bar turning equipment, heat treating facilities and new materials handling units also are planned. Carpenter figures that it will spend some $9 million before its expansion is completed.

Barium Steel Consolidates

Barium Steel Corp., New York, N. Y., has merged its plate, pig iron, structural and steel tube plants into a new company to be known as Phoenix Iron & Steel Co. The main divisions will be known as Plate Division, Harrisburg, Pa., (formerly Central Iron & Steel Co.); Blast Furnace Division, Chester, Pa., (formerly Chester Blast Furnace Inc.); Structural Division; and Phoenix Steel Tube Division, both of Phoenixville, Pa.

J. A. Sisto, Barium's chairman, says that the integration will provide more efficient production and quality controls from pig iron to finished products, in addition to other operating benefits resulting from centralized management.

Hoskins Expands in Canada

Hoskins Mfg. Co., Detroit, organized Hoskins Alloys of Canada Ltd. as a wholly owned subsidiary and purchased the Wire Drawing Division of Walker Metal Products Ltd., Windsor, Ont. The Canadian subsidiary will occupy a plant being built in the Toronto, Ont., area. Elmer Berndt is operating vice president in charge of Hoskins' Canadian operation.

Ladish Buys Two Plants

Ladish Co., Cudahy (Milwaukee), Wis., maker of drop forgings, pipe fittings and rolled rings, purchased two manufacturing plants in Los Angeles: CBS Steel & Forge Co. and General Pacific Corp. They will be operated as the Ladish Pacific Division, 3321 E. Slauson Ave. J. L. Varga, who established Ladish Co. of Canada Ltd., will manage the new property.

Pressure on Profits

Speakers at Drop Forging Association's fall meeting stress the profit squeeze. New money demands for plant expansion and research are called critical

WHAT'S a fair profit? How do you make one?

That was the dual theme of the fall industry meeting of the Drop Forging Association at Chicago (Oct. 27-28). Norman W. Foy, vice president of Republic Steel Corp., Cleveland, said that in steel an improved profit picture is essential if the expansions planned for the next 25 years are to be carried through.

Pressure on Profits—Steel, remarked Mr. Foy, must improve its attractiveness to investment capital. Income for all manufacturing (expressed as a return on capital investment) has averaged 12.5 per cent over the last 15 years. Income for steel for the same period was 9.2 per cent.

Built today, he added, a new, fully integrated steel plant could only be expected to give a 2 or 3 per cent return on investment.

The major part of steel's expansion program will have to come from new facilities. By 1960 at the latest, by which time all feasible additions to present capacity will have been made, the pressure on profits will come to a head.

Competition Key—Gordon Walker, president of Walker Forge Inc., Racine, Wis., following through on the "Profits and Prosperity" theme, said that the profit problem was tied up in maintaining the drop forging industry's growth rate against increasing competition from other metalworking processes.

He made these suggestions: Set up incentive and stock ownership programs for supervisory employees; establish management development programs; make research expenditures part of the regular budget; and spread the exchange of technical information within the industry.

Structural Steel Bookings Up

Bookings of fabricated structural steel were 339,461 tons during September.

The American Institute of Steel Construction says this is 64 per cent higher than last September's bookings and is the second highest monthly level of 1955.

September shipments of 289,128 tons were the highest monthly total this year; a 9 per cent increase over the same period in 1954.

Backlogs of work available for fabrication stood at 1.9 million tons as of Sept. 30, according to AISC.

Machine Tool Orders Pick Up

Machine tool shipments for the first nine months of this year total $476.3 million, compared with $722 million a year ago.

Shipments in this period last year were high because toolmakers were catching up with the 1953 backlog of defense orders. For the year they hit $891.7 million.

The machine tool industry estimates new orders for the current nine-month period to be $579 million—almost $158 million over the $421 million for the first three quarters of 1954. Shipments and new orders are for metal cutting types only.

The new order index for September stands at 207.1; shipments are 195.1. In August, new orders indexed at 221.3, shipments at 164.6.

Although September orders dropped, manufacturers say a downward trend isn't indicated. Many companies were holding orders until the Machine Tool Show was over.

Some firms say orders from the show are running their bookings up to 20 or 30 per cent over September orders.

Steelworker Local Celebrates

United Steelworkers of America, Local No. 2, celebrated its 60th birthday, Saturday, Nov. 5, in Joliet, Ill.

The local represents about 375 workers at Phoenix Mfg. Co. Company-Union relations record for 60 years: Two authorized strikes in 1913 and 1942; one postwar wildcat walkout.

Local No. 2's first charter was under the Amalgamated Association of Iron, Steel and Tin Workers of America. It affiliated with the steelworkers in 1942.

New Process Adds Life to Backup Rolls

Blaw-Knox Co., Pittsburgh, finds that cold rolling backup roll fillets increases tensile strength, bolstering fatigue limits to reduce breakage in the fillet

Office Automation

It poses no threat to employment, may bring men back to skilled clerical work, study reveals

THE NATIONAL OFFICE Management Association has some answers on what automation will do to office employment by 1960.

W. H. Evans, NOMA executive vice president, reports: "Automation may well reverse the trend which has women office employees outnumbering men." He adds: "Education is needed to learn how to use machinery effectively."

Two-Year Survey—NOMA hired Drexel Institute, Philadelphia, to study the problem. Here's what it came up with.

The number of office machines will increase at a rate limited only by industry's ability to develop machines and train operators.

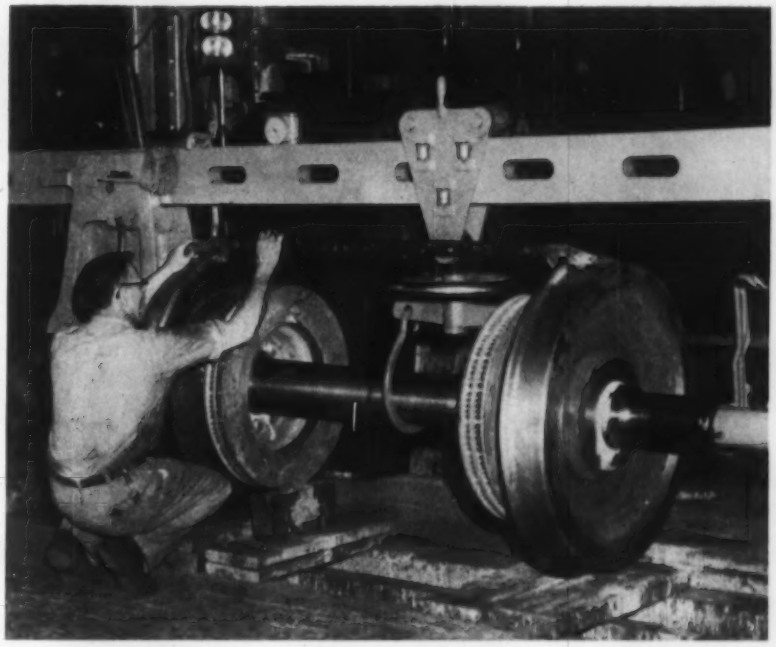
Employment—By 1960 there will be 300,000 office machine operators, compared with 150,000 in 1950. Employment apparently will double every ten years for the next few decades. Total office employment will increase about 1.4 million in the same period.

The survey bears out Mr. Evans' statement. It says: "Men who have been leaving office work in growing numbers are being wooed back to the office by machines." Heavy and complicated equipment is usually entrusted to male workers.

Premium on Experience — The office machine demands skilled office workers. The demand for them now exceeds requests for unskilled workers.

The final point of the study indicated that a further economic upswing will produce a shortage of experienced workers.

In summarizing study results, Mr. Evans warned: "Impending changes cannot happen overnight. Time is required to develop and produce equipment. Manufacturing costs must be reduced to make such machinery practical for any but the larger companies. Many companies will hold off purchasing such equipment during the pioneering period. Finally, many other companies are probably too small to ever use electronic equipment economically."



Mounting railroad wheel assembly with disc brakes

Sales with a Future

SERVING growing industries is the prosperity prescription at Baldwin - Lima - Hamilton Corp.'s Standard Steel Works Division, Burnham, Pa.

Before World War II, Standard sold 90 per cent of its products to railroads. When diesels came along, a study showed railroads would use smaller volumes of steel forgings, castings and rolled wheels, tires and rings.

More Customers Needed—Then came the decision to serve industries which had brighter prospects for increased purchasing. Railroads still require a hefty 40 per cent of shipments, but other leading customers have taken on a new look.

Best ring customers are producers of all types of rotary machinery. Among the steadiest users are manufacturers of gear rings and the oil and chemical processing industries.

Atomic Age Consumers — "We intend to increase our volume of sales to builders of jet aircraft engines and atomic energy plants," reports Fred E. Greger, sales manager. Standard also is looking farther afield — selling railroad tires and wheels to India and Korea.

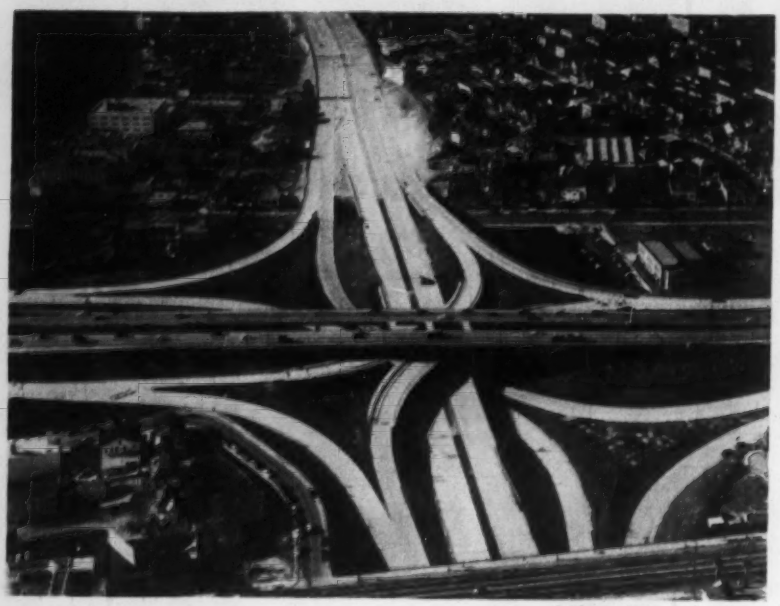
First Results — Standard's new look at customers and applications already is paying off.

"Development of our industrial business is largely due to a more intensive search for new applications following a bolstering of our sales force," explains John D. Tyson, vice president and general manager.

For Better Quality — "Demand for top quality of product has increased rapidly in postwar years from both railroads and other customers," asserts Mr. Tyson. "While we are taking a completely new look at customers and building our sales force, quality becomes even more important."

Standard has installed a direct-reading Spectrograph to analyze heats. It insures improved quality as it permits almost instant analysis of steel in the open-hearth furnace.

All this adds up to more customers and better sales for Standard.



California Division of Highways

Congress balked last spring, but now the heat's on for . . .

More Money for Roads

NEW HIGHWAYS will be a "must" item on the calendar when Congress gets back to work. Pressure for better roads is strong—there was much disappointment because highway legislation withered on the vine last spring.

It's almost certain that more federal money for roads will be put up—but it's just about as certain that it won't be as much as government and private groups say is needed.

Defense Need—Current federal aid to highways is pegged at $875 million a year, most of which is matched 50-50 by states. That will probably be upped past $1 billion—some improvement but only about half of what experts say is needed to kick off a really effective highway program. It's far below the $5 billion a year such a program would need after it got rolling.

Top attention is on the 40,000-mile interstate highway system—it's vital to national defense. Recommendations are for more than 50 per cent federal aid on that part of the road network—over 90 per cent in some cases.

Money Snag—Financing is the big problem. Bond issue suggestions haven't proved popular. More likely are a pay-as-you-go plan, higher taxes on highway users. Also likely to come up are tries to end the hodgepodge of state highway laws—especially as they apply to truckers.

There are over 60 million motor vehicles registered in the U. S. In ten years there will be 80 million; in 1975, 92 million, predicts the Independent Advisory Committee to the Trucking Industry Inc.

The number doubled in the last ten years with only about a 1-percent addition to national road mileage—that explains the cry for more and better roads.

Automation Gets O.K.

No blue laws against automation will result from recently ended hearings. That's the prediction of Rep. Wright Patman (Dem., Tex.) who headed the subcommittee.

Areas that may get attention are incidental to automation, such as the sore need to train scientists and technicians and the training and retraining of displaced workers. But even that's in the future.

Representative Patman said most industry representatives at the hearings recognize their responsibility to retrain workers. He did, however, hit the railroads for "not recognizing their responsibilities." It's possible that legislation might be needed on the state or local level if unemployment comes to the railroad industry because of automation-caused layoffs, he said.

Here and There

The government's budget may balance this year. Reason: Receipts substantially higher than expected. In the July-August-September quarter, income was $1.3 billion higher than a year ago—originally, a $1.8-billion increase for the full year starting in July was forecast. But spending will be higher, too—mostly in the Defense department . . . Expect plenty of scrapping in Congress before any tax cuts—Sen. Harry Byrd (Dem., Va.) says it's unsafe to make a permanent tax reduction based on present boom conditions and revenue; any budget surpluses now should be used to pay off the debt . . . Sen. Walter George (Dem., Ga.) favors tax cuts in 1956 for low and middle income groups. Both senators are on the tax writing Senate finance committee . . . Defense contracts worth $101.5 million were let in flood disaster areas in seven weeks following Hurricane Diane, says the Defense department . . . More consolidation of buying by the Armed Forces is being considered by the Defense department.

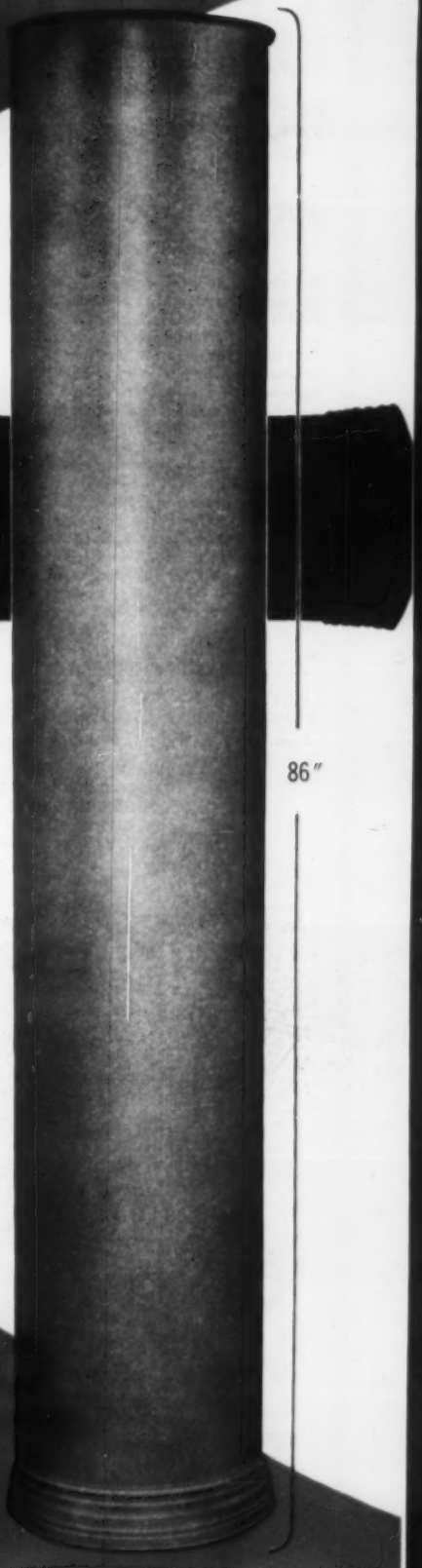
"CHIPLESS MACHINING"
Cincinnati 42" x 30"
Duplex Hydrospin

THE CINCINNATI

Hydrospin

11"

roll-flows this 11" blank . . .



86"

into this 86" seamless steel tube

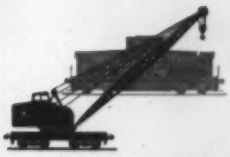
JOB DATA: The blank is a billet-pierced, ring-rolled forging of annealed AISI 4140 aircraft quality steel, machined to 11" long x 13½" I.D. x ½" thick. The ring, slipped onto a straight, hardened mandrel, was *roll-formed* to the desired dimensions in less than 25 minutes (floor to floor time). "*Chipless machining*" by the Cincinnati Hydrospin reduced the wall thickness 92%. The finished tube is 86" long x 13.500" I.D. x 0.040" thick. Hardness increased to Rockwell C 39. Tensile strength after Hydrospinning is doubled. I.D. finish is 10 micro-inches and O.D. finish is 30 micro-inches or better.

HYDROSPINNING is the first economical method available for producing precision, thin-wall seamless tubing. Let a Cincinnati Milling field engineer give you detailed information. For a description of the Hydrospinning process and machine specifications, write for Bulletin M-1873-1.

CINCINNATI **Hydrospin**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

YOU BUY ONE MACHINE . . .
GET THE PERFORMANCE OF TWO



BROWNHOIST *diesel-electric locomotive-cranes double as switch engines*

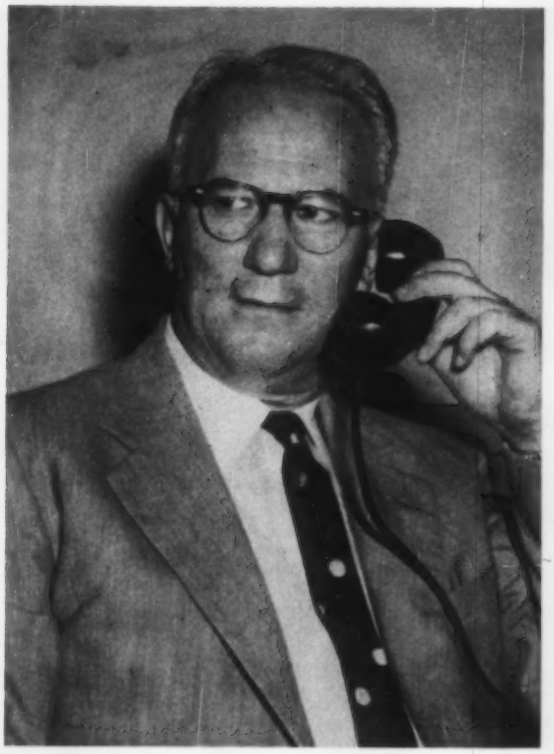
The exceptional performance of Industrial Brownhoist Diesel-Electric Locomotive-Cranes handling bulk materials with magnet, hook or bucket is well known to railroads, mines, steel mills and other large manufacturing plants. Not so well known, perhaps is the fact that these powerful, efficient machines perform equally well as switch engines. Employing electric powered locomotion with the same type of travel generator, motor and axle reduction unit as modern switching locomotives, Brownhoist Cranes provide rapid acceleration, high drawbar pull and speeds of twelve miles per hour for switching operations. They will haul up to 7 or 8 heavily loaded cars on straight, level track. During switching operations, the rotating superstructure that actuates the crane mechanism can be mechanically disengaged to eliminate wear on the shafts and other driven parts in the upperworks. Brownhoist Cranes are available in capacities from 25 to 90 tons and up for your switching and heavy duty materials handling operations — two dependable pieces of equipment in one husky unit for greater versatility and economical operation. For complete information, consult your nearest Brownhoist representative or write us today.

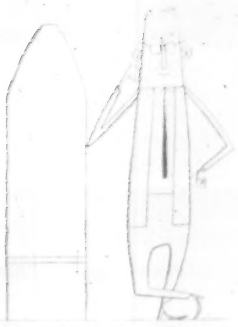
INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

BROWNHOIST MATERIAL HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

BROWNHOIST

BUILDS BETTER HEAVY DUTY MATERIALS HANDLING EQUIPMENT





J. A. Ward: His Business Is Blockbusters

WHEN the huge (17,000 acres) Louisiana Ordnance plant was being built, they say four wells had to be drilled to get water. The first three were capped. They produced oil.

General Manager J. A. Ward is still chuckling, but disclaims any first-hand knowledge of the incident. It *is*, however, the way he works. When he needs water, he *gets* water.

As civilian head of the Army Ordnance Corps installation, he is the top shell production expert for Remington-Rand division, Sperry-Rand Corp. His job: Be ready for maximum production while operating efficiently at only a fraction of shell-producing and shell-loading capacity.

Mr. Ward went to the base, near Shreveport, in February, 1951, when it was re-opened as a shell-loading facility. Starting with a group of buildings, he oversaw installation of all equipment and the start of production. He also supervised the erection and equipping of a shell manufacturing plant on the base. This plant was in pilot-line production six months after ground was broken.

The plant is one of the most modern of its kind in the country. In full production on one line, three more are ready to go whenever they are needed.

Solid Ground—This isn't his first shot at the ordnance game. He formerly was director of maintenance at the Remington-Rand-operated Sangamon Ordnance Plant. While there, he designed and built many special machines that now are standards in shell production.

That was during World War II. After the war, he went with Standard Brands Inc. as chief engineer of the Chase & Sanborn division. Then he returned to the ordnance business at Shreveport.

An electrical engineer from Purdue University, his career has covered most phases of management. He was with Cities Service Co. for 12 years as a sales engineer and superintendent of an operating department. After that, he was general manager of the Manufactured Gas division, Republic Light, Heat & Power Co., Tonawanda, N. Y.

Mr. Ward makes his home on the closely guarded base. His favorite pastimes, duck hunting and fishing, are naturals for Louisiana.

Rotor Tool Co.

Compressed air industry says automation will help . . .

Air Tool Sales Increase

COMPRESSED AIR tool sales are expected to hit about $125 million this year.

The 25 member companies of the Compressed Air & Gas Institute are willing to admit sales have jumped 50 per cent in the last ten years. They also look for a 17 to 20 per cent increase next year. These figures do not include a baker's dozen of smaller companies that may manufacture one or two specialty tools.

Compressors—Perhaps the most important part of any air or gas operation is the stationary or portable compressor. There are two general types: Positive displacement (reciprocating and rotary) and dynamic (centrifugal, axial and mixed flow).

A bicycle pump is a good example of a positive displacement compressor. Dynamic types impart velocity and pressure to air through rotating vanes.

Why Use Air — One big reason for the increasing use of compressed air is the variety of projects to which it can be adapted. Long used for pavement breakers, foundry chipping hammers and drills, compressed air hoses today are conveying grain from storage bins and agitating chemical liquids by aeration. Air also is used as a coolant or lubricant in many industrial operations. Air tools are particularly well suited to jobs where an explosion might be caused by sparks from electric tools.

Who Uses Them—Automakers use more air tools than any other industry. Aircraft manufacturers run a close second. Construction and mining have used air tools for years.

Automation—This is the coming trend for compressed air. Right now in automobile factories, multiple nut runners, operated by air, fasten up to 20 nuts at a time. Air-powered conveyor lines then move parts to another section.

Problems — Some experts have expressed a fear that new power developments may throw compressed air into the discard, but manufacturers don't agree.

Leslie B. Schramm, secretary of Schramm Inc., West Chester, Pa., and president of CA&GI says: "Twenty years from now supersonic sound might replace air drills for mining operations, but compressed air will still be used to haul out the broken rock."

Meanwhile, the immediate problems center on portable tool torque control, reducing noise and maintaining stable pressures in air lines.

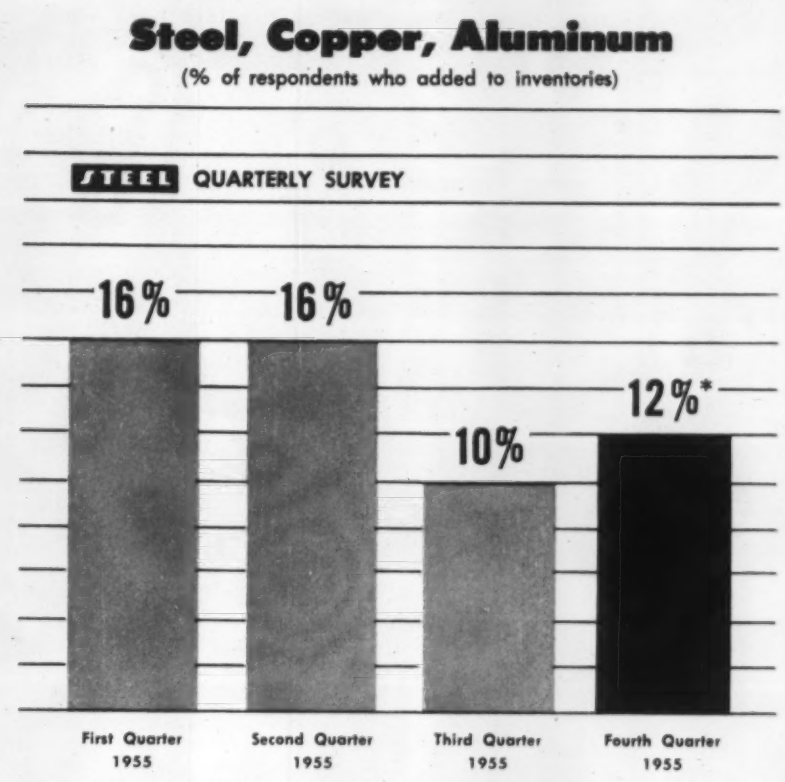
GM Hits Employment Record

General Motors Corp. employed more people in the first three quarters of this year than at any similar time in the company's history.

Harlow H. Curtice, president, says that an average of 621,958 GM employees earned $2321 million during the first nine months of 1955. This compares with 577,069 wage earners, who totaled $1930 million in a similar 1954 period.

Third quarter employment and payroll figures added up to 615,966 and $758 million, compared with 1954's 538,619 and $601 million.

Overtime in GM plants in this country brought the average workweek for nine months up to 42.7 hours from 39.9 hours a year ago. Average weekly earnings rose to $102.21 from $89.85 in 1954.



Survey includes: Steel products (bars, strip, sheet, plate, structural shapes, wire, tubing), pig iron, copper and brass mill products, copper wire and cable and aluminum products
*Estimated

Metal Users Outrun Supply

"MILL DELIVERIES extended; warehouse stocks inadequate."

"More lead time required to maintain good inventory position."

"Steel mills 'way behind on everything."

"We are buying at premium prices because we can't get delivery from mills or warehouses."

Worries—Those are purchasing agents' comments to STEEL's latest checkup on the inventory and delivery situation on steel, copper and aluminum.

"A sad picture," is the way one discouraged PA sums it up—at a time when metal producers are working at near capacity.

Pointing up the seriousness: Steel shortage is forcing a one-third cutback in freight car output at Pullman Standard Car Mfg. Co.'s Butler, Pa., plant. About 200 on the plant's 1600-man workforce will be laid off; the company hopes to bring them back about the first of the year.

To Come—One-third of the PAs think the situation will get worse in the coming three months. A few hope to build up their stock; the majority think they'll be able to hold their own (though many added "I hope" to their replies).

Causes of the pessimism: "Although we are in a fairly good position, deliveries have been extended much too far to remain in a well stocked position," ventures a New York area PA.

Next Year—"Deliveries are fairly adequate now. Our concern is for early 1956! We cannot place orders in sufficient quantities and in proportion to present use," says a PA in Pennsylvania.

Aggravating the situation: Some steel users that generally have declines this time of year report business is holding up better than usual.

Quotas—The reaction to being put on quota or allocation by mills is mixed. A Chicago PA sees perhaps a slight improvement in his firm's position.

Not so fortunate are firms in lines that had a bad time last year. The PA for a big farm equipment producer sees his firm's inventories dipping: "Allotments are based on previous year purchases, which in our case were low."

Tears—Adding to the problems: 1. "Some suppliers are overextended on delivery promises, so it fouls up their deliveries. Takes a heap of crying to get delivery as promised," writes a Clevelander.

2. "Mill not accepting any orders for the balance of 1955. Books not open for 1956," says a PA in Pennsylvania.

3. "Have been successful in having orders accepted by mills, but deliveries run 30 to 60 days later than required. Deliveries of even current orders are running two to four weeks late," reports an upstate New York executive.

Sliding—The tightening supply situation shows up in inventory levels indicated on survey returns. On most items, roughly half the respondents say they are in the 30-to-60-day range. Most of the rest are below that. Biggest movement over the last three months was a drop from the 60-to-90-day category. The 10-to-30-day and less-than-ten-day ranges expanded.

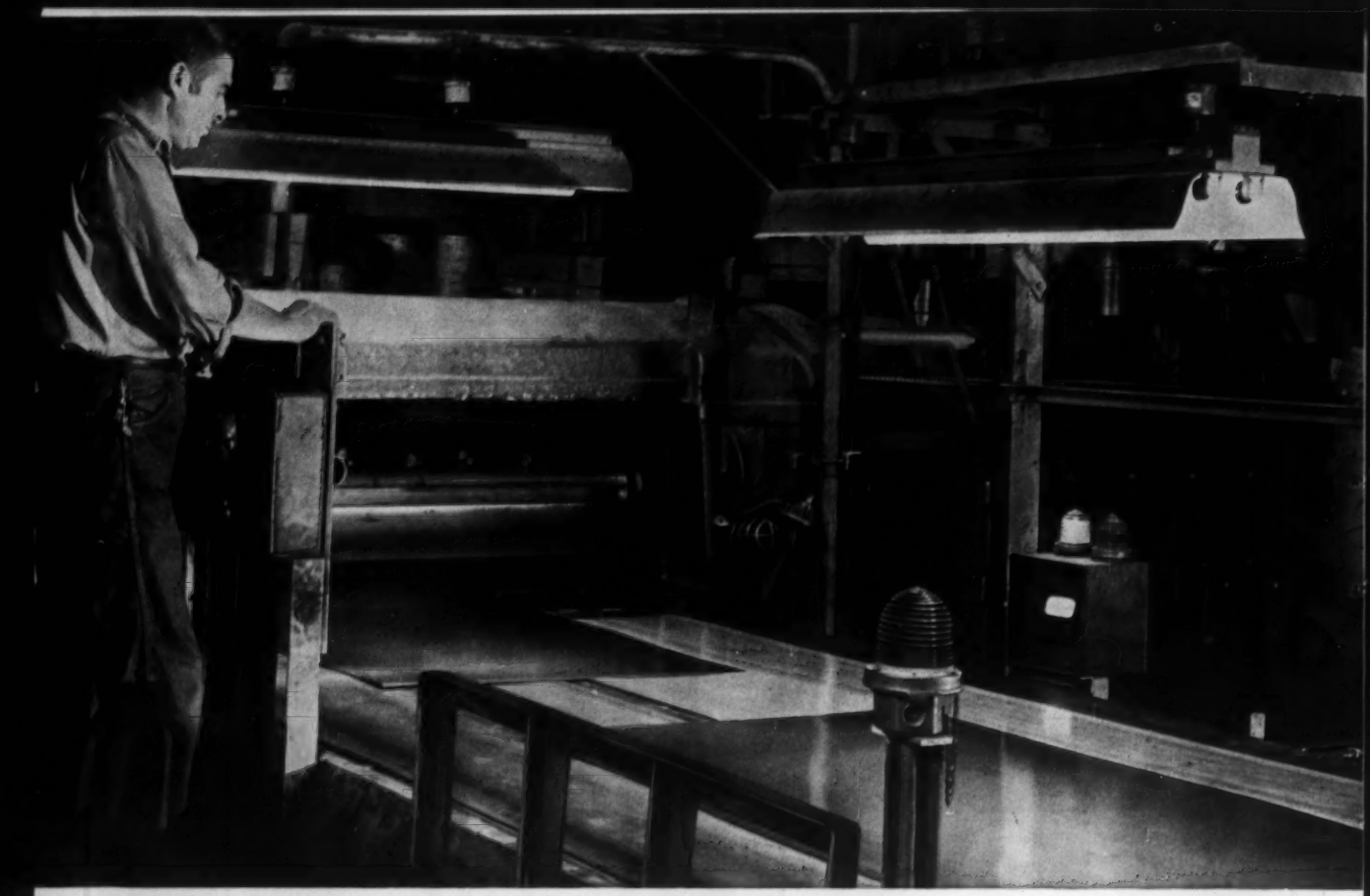
Three-fourths of users report delivery problems on one or more products. Greatest demand was for more plates, both light and heavy; about two-thirds of the users have supply difficulties.

Snags—Structural shapes are another particularly sore spot, a little surprising considering the season. Sheets are also tight, mostly because of auto needs.

Users of bars have strongly felt tightening steel supply. "Carbon bar situation is bad, with most mills out of the market for January and possibly part of February," notes an Ohio executive.

Copper and its alloys were harder to get. Aluminum remains tight.

A good many steel, copper and aluminum users are in the same boat with this Virginia firm: "We are using material faster than we can replace it from normal sources of supply."



How Great Lakes Steel *X-rays* quality

Above: Stacking sheets after the X-ray check. *Below:* With dozens of tests passed and uniformity assured, the flat-rolled steel is O.K.'d for wrapping and delivery.

Why do sheets from Great Lakes Steel consistently meet customers' specifications? The X-ray machine is one of the answers. Here an indicator (shown above) signals the thickness of steel sheets as they pass on a conveyor belt. Any sheet failing to meet the established standard is immediately ejected.

Throughout the Great Lakes mills, modern machines and experienced men work together to maintain the consistent quality of our flat-rolled products. Our service includes close contact with customers by Great Lakes representatives, men who are concerned not only with steel production but also with the performance of our steel in the plants of customers.

The next time you have a problem in steel, give us a call. You will find that both quality and service are *consistent* at Great Lakes Steel.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

New models come out, too, for . . .

Checker Cab: Automaker

INDEPENDENT automaker is a term perhaps best defined by one of the least known, Checker Cab Mfg. Corp. of Kalamazoo, Mich.

To most folks the name is identified with cab operation rather than manufacturing. Founded in 1922 to build cabs for Co-op Checker Taxi Co. in Chicago, the firm took over the Kalamazoo plants of departed Dort and Handley-Knight a year later. It maintains today, as it did then, that taxicabs have special requirements not met by the normal passenger vehicle.

Checker is in a good position to know. It owns 62 per cent of Parmelee Transportation Corp., Chicago, which controls operating subsidiaries in four cities and turned in three times as much profit last year as the parent company. The Checker name is spread wider than the scope of company ownership however, since its use has never been restrained.

Live Tests — As an operating company, Checker uses its fleets as a proving ground for its products and those of the competition. It hangs its whole sales pitch on low operating and maintenance costs and has uncovered some amazing statistics in support of its cause. A Checker-built cab can be operated for about 1 to 1¼ cents a mile. The conventional passenger-car cab costs about 3 cents a mile, according to Checker records gathered under comparable circumstances.

Normal life of a Checker cab is figured at 150,000 miles or 30 months, whichever comes first. It's unusual if the head has to come off during that period. Usual top overhaul time on conventional vehicles is about 70,000 miles.

Nobody knows how far you can drive a Checker cab. During the war, a fleet of them put on over 500,000 miles each, but they were sold for further operation in smaller communities.

Available — If you're thinking about now that you'd like to buy a Checker, the factory (the company has no dealers) will be happy to sell you one. But before you place your order, here's a rundown on some of the factors in Checker's taxi-designed vehicle. Horsepower is about 85, and can be hiked to around 100 with the power pack. But peak torque (180 foot pounds) is reached at only 1200 to 1400 rpm. Top speed is in the vicinity of 65 mph, with a vehicle weight of about 3700 lb. The vehicles are available in standard and Driv-Er-Matic models.

The Driv-Er-Matic offers such plus features as automatic transmission, power brakes, power steering, four-way seat, auxiliary folding seats in the rear and an exclusive, power rear window. Less taxes, this model sells for $2206, features optional low-compression cylinder heads of 5.43 to 1, compared with the 6.7 to 1 standard. This ratio for low-speed operation permits the use of low-grade fuel.

What's more, Checker offers one of the few all-new vehicles for 1956 and is selling this Driv-Er-Matic version for more than $200 less than last year's standard job. This year's standard will go for $1805, a cut of over $600, as most automakers up prices. From that you might conclude that the taxi business is getting competitive. Indeed, it is.

Sales Race—On the basis of figures alone it might be difficult to justify the interest of big manufacturers in the taxi field. There are only about 77,000 cars in the country licensed as cabs—though it's estimated about 140,000 are in service when communities that don't require licensing are included. Plymouth, which claims about 70 per cent of the 45,000 new cabs sold annually, has just introduced a new model reported to be the first in the industry by a major manufacturer. A new Dodge taxi is making a bid, and, of course, Chevrolet and Ford are looking with increased affection on the hack field.

One Detroit spokesman explains that selling cars in every market,

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no matter how limited, is important. But he cites a second reason of perhaps greater significance: People who ride in cars which can take the punishment of taxi service are likely to think that they are rugged vehicles and will be swayed accordingly in their purchase.

Checker feels ready for the competition, expects to double 1955 sales and top the 9900 units sold in 1929, its best prior year. One reason is its all-new cab, shortened to comply with recent ordinance changes in New York City. Offering a 120-in. wheelbase, the cab is only 200 in. long and sports more room in the back than anything competing from Detroit. All four fenders are removable in minutes, getting the cab back on the road in lube-job time while a damaged fender is repaired at leisure.

Under the Hood—The engine is distinctly visible when the hood is lifted, including such forgotten items as distributor, spark plugs, fuel pump, carburetor and oil dip stick. Design is such that any item under the hood may be reached and serviced from the front, including complete removal of the engine—thus avoiding the need for service room along the sides of the cabs to reduce garage space.

The Plant—The second major factor in Checker's bid for more of the cab market in 1956 is its revamped manufacturing facility. Retooling cost about $4 million, a hefty sum for a company that netted only $721,000 last year. Some of its ideas probably will get attention in Detroit.

Checker believes it is using the biggest plastic die ever produced for its roof panel. Also being made on plastic dies are floor pans, doors, hood and rear deck panels. Until this year, it bought its large stampings outside, but with plastic tooling and 40 presses ranging up to a new 750-ton Clearing double-action toggle job, the firm figures it can do the job itself. The pressroom runs about 1000 parts with each die for stock, then changes to another part. The cycle runs about four weeks between runs on a given part, and the only improvement Checker feels might be made in its plastic tooling is the use of steel draw rings on some of the larger parts to reduce abrading.

Production — Completely revamped, and perhaps most interesting, is the new assembly line. It starts logically but uniquely with the assembly of the frame. Box sections are welded in a conventional fixture and then placed in straightening jig. Most taxi collisions are of the front-end type. Indicative of the ruggedness of the frame which features double channels at the front is the fact that air pressure of 2600 psi is required to bend the channels to bring the frame within 0.015 in. of perfect alignment.

The frame is hung on an overhead conveyor and is suspended at the center on each end. This permits workmen to turn the frame to any desired position as front and rear suspension, muffler and tailpipe, brake lines, etc., are added (these parts are purchased outside). Next, the frame enters a spray booth. Dollies are located on each end of the frame as it leaves the booth. They automatically engage a floor conveyor.

The Continental engine (Continental Motors Corp., that is) is dropped into the chassis after the transmission and engine accessories (purchased from suppliers) have been added. The torque converter, incidentally, is located by two dial indicators within 0.004 in. perfect alignment with the crankshaft to insure long and quiet operation.

Then—Metal finishing includes the interior as well as the exterior of the car due to Checker's sheet steel interior. After welding and soldering, the unit enters the lead grinding booth and emerges for final metal finishing, hanging of doors and rear decks. The body-chassis unit then transfers to another conveyor automatically (altogether, there are eight in the system) which takes it upstairs. On the way, it passes over an undercoating booth and then transfers to a three-speed conveyor, which indexes rapidly into and out of booths, dwells during the time the bodies are in the booth.

A plastic hood is placed over the engine for protection, and the bodies are washed, rinsed, bonded, dried, prime sprayed, dried and then given two color coats, with a dry following each. The interiors are sprayed with a system in which the body is its own spray booth. A cover is placed over each window, one being fitted with a suction tube to remove excess particles.

Even more significant, there is no sanding between coats. Checker persuaded a supplier to develop a prime coat as well as lacquer finish coats which dry to a high luster without the need for sanding or polishing of any kind. It's likely that Detroit will show more than the usual interest in that development.

Finale — The bodies are then trimmed, fenders and hood are added and the bodies return to the first floor. On the way down, wheels are added and the dollies drop off automatically as a floor conveyor takes over putting the car on its own wheels. After final servicing, alignment of front wheels and a trip around a small test track, another Checker is ready to begin its long battle with traffic.

U. S. Auto Output

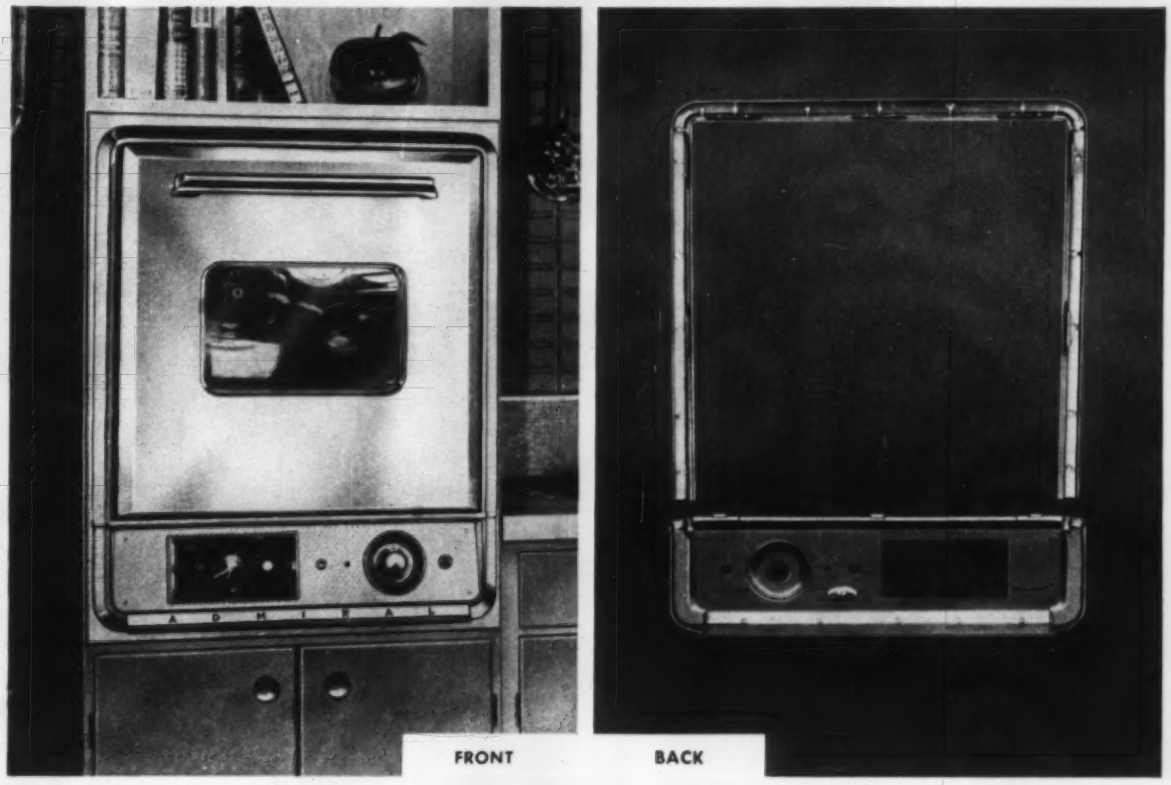
Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,337†	285,860
October		236,635
November		508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Oct. 1	115,723	64,115
Oct. 8	80,271	63,925
Oct. 15	101,581	44,882
Oct. 22	137,425	45,649
Oct. 29	156,377†	68,649
Nov. 5	165,000*	92,766

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

WHY ZINC RATES FIRST IN DIE CASTING • NUMBER 6 OF A SERIES



FRONT BACK

rigidity –as needed by *Admiral*

Built-in electric ranges and wall ovens are the latest products of the fertile minds of appliance designers. And the most efficient methods and materials are employed for each component of the new space-saving cooking units. The illustrated custom wall oven by Admiral, with its ZINC die cast inverted-U door frame and control panel, is an excellent case in point.

Obviously the frame and panel (back views above) could have been stamped from sheet metal, but not with the qualities and economies of these ZINC die castings. Stampings not only would lack the desired rigidity, but would not possess the following additional advantages obtained with die castings:

1. No scrap loss
2. Integral mounting bosses for easy assembly
3. Dimensional accuracy for perfect fit of mating parts
4. Bold raised lettering on the control panel
5. Smooth as-cast surfaces which—being ZINC—take, and hold, beautiful chromium plating applied by commercial methods

Watch for other examples of ZINC die casting economies in our future advertisements. Send for our brochure and contact any commercial die caster for the answers to your particular production problems.

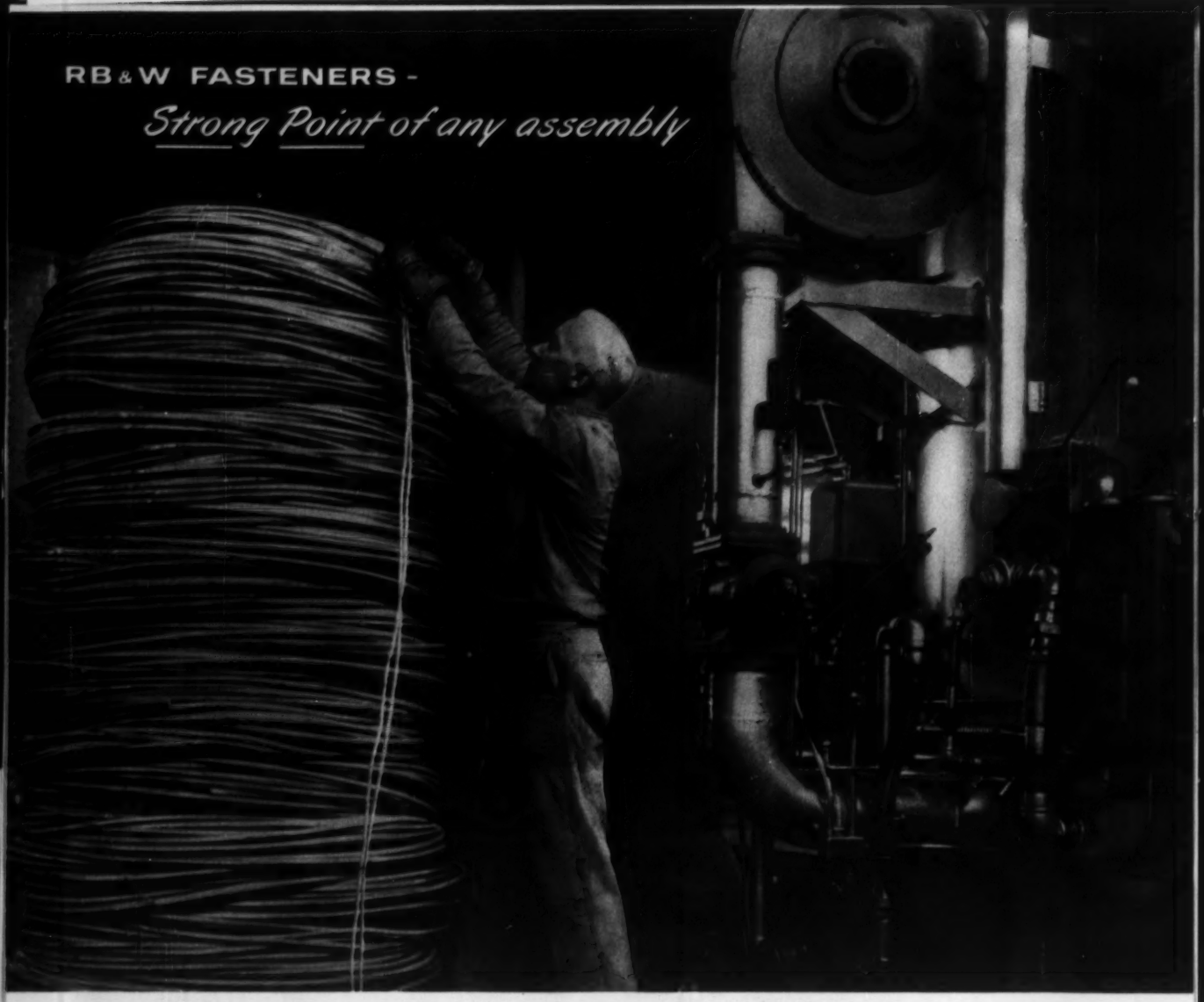
ZINC
FOR DIE CASTING ALLOYS

The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

RB&W FASTENERS -

Strong Point of any assembly



Where the heat's on to lift bolts and nuts out of the ordinary

You won't see these spheroidizing furnaces in many bolt and nut plants. They call for a big investment of money. But to a company that wants to be sure of conditioning metal for the best bolt and nut possible, they're worth it.

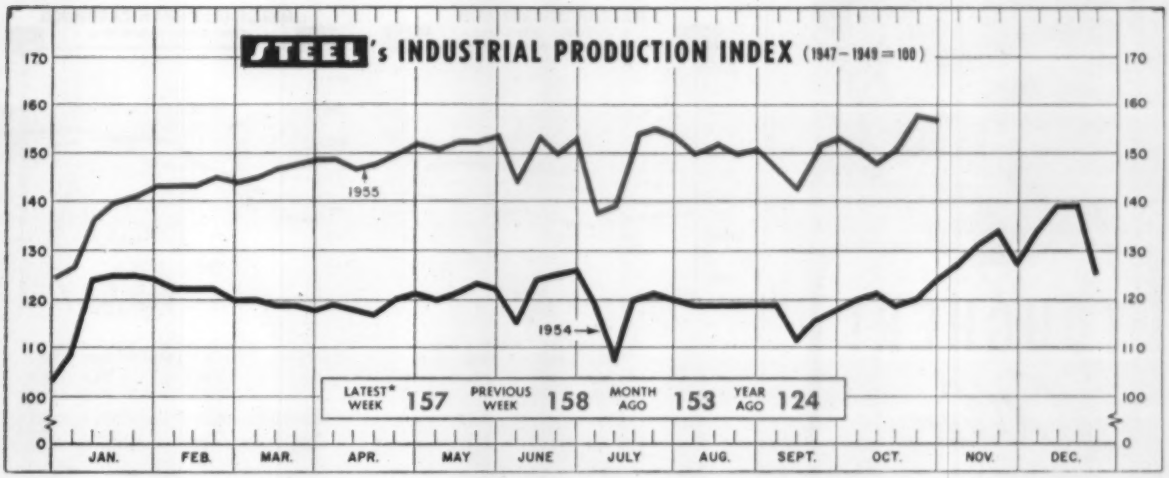
In the photo above, you see R. M. Hubley setting up to anneal coils of wire rod to change its structure for the better. Next, he'll hoist the furnace at right, setting it down over the stacked coils. This special equipment makes it possible to accurately control the heating, cooling and the atmospheric conditions inside the housing.

Working with the most modern and complete facilities, RB&W men can bring to bear the full extent of their experience. And experienced they are . . . most have long years of service in the company. Some have followed their fathers' and even grandfathers' footsteps.

It's this combination of equipment, experience and quality control throughout RB&W plants that assures you more quality for your money . . . a reliable source of supply . . . and strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** New Orleans; Denver; Seattle. **Distributors** from coast to coast.



*Week ended Oct. 29. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Confidence: Do Businessmen Have It?

YOU HEAR a lot of talk about *Business Confidence.* About how continuing good business depends on it.

Here are recent statements by metalworking executives:

Near Record — B. E. Estes, director of commercial research, U.S. Steel Corp., predicts: "The steel industry will produce in 1956 very close to the record of about 115 million ingot tons anticipated for 1955. In terms of current capacity this is an operating rate of better than 90 per cent. We expect that the industry will average better than 95 per cent in the first half of 1956 and 85 per cent plus for the rest of the year."

The top men at General Motors, Harlow H. Curtice, president, and Alfred P. Sloan Jr., chairman, say: "Confidence in the progress of the national economy is widespread, and the public has the desire and ability to buy."

Strong Appetite—H. A. Roemer Jr., president, Sharon Steel Corp., states it this way: "Operations at present are at capacity. Customer demand for our products continues strong. The backlog of orders assures capacity operations throughout the balance of the year, and indications are that a good demand for steel products will continue in 1956."

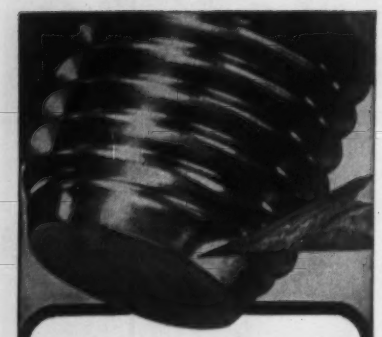
Clevite Corp.'s bearing and bushing business is enjoying one of the largest peacetime years on record; sales in the electronics field have also improved over last year's. "We believe that our business will continue at high levels into 1956," report James L. Myers (chairman) and William G. Laffer (president).

Favorable Outlook—Kawneer Co. fabricates aluminum for the building, aircraft and appliance industries. President Lawrence J. Plym sees this: "The construction of retail, business, office, industrial, educational and hospital structures is creating a growing demand for our building products. Use of our appliance products by the major manufacturers continues to spread. Kawneer's outlook for the final

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,368[1]	2,413	1,822
Electric Power Distributed (million kw-hr)	10,630[1]	10,644	9,033
Bitum. Coal Output (1000 tons)	9,815	9,760	9,033
Petroleum Production (daily avg—1000 bbl)	6,680[1]	6,753	6,174
Construction Volume (*ENR*—millions)	$295	$420	$220
Automobile, Truck Output (*Ward's*—units)	188,110[1]	169,197	90,662
TRADE			
Freight Car Loadings (1000 cars)	830[1]	834	756
Business Failures (Dun & Bradstreet, no.)	215[1]	239	229
Currency in Circulation (millions)[3]	$30,498	$30,621	$29,970
Dept. Store Sales (changes from year ago)[3]	+8%	+8%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,076	$24,116	$19,337
Federal Gross Debt (billions)	$280,033	$280,008	$278,741
Bond Volume, NYSE (millions)	$18,766	$15,910	$16,550
Stocks Sales, NYSE (thousands of shares)	8,992	8,666	10,489
Loans and Investments (billions)[4]	$85,542	$86,102	$84,675
U. S. Govt. Obligations Held (billions)[4]	$30,941	$31,419	$37,403
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	264.1	263.9	218.4
All Commodities[7]	111.1	111.2	109.6
Commodities Other than Farm & Foods[7]	118.7	118.6	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100



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LEADER POINT CAP SCREWS

Dropping, knocking against metal surfaces and faulty line-up are major causes of damaged threads. Allen's new unthreaded leader point substantially reduces the causes of screw thread injury, or damage to threaded holes. Grip Heads, precision fit sockets that adhere to the key, *plus* the new leader points, make Allens the world's easiest starting cap screws, particularly in inaccessible spots. Sold *only* thru leading Industrial Distributors.

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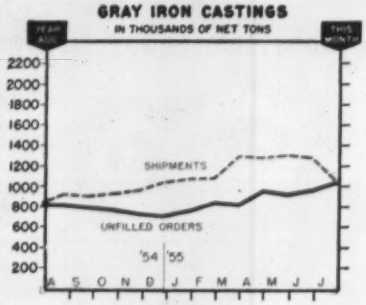
MANUFACTURING COMPANY

Hartford 2, Connecticut, U.S.A.

THE BUSINESS TREND

GRAY IRON CASTINGS

IN THOUSANDS OF NET TONS



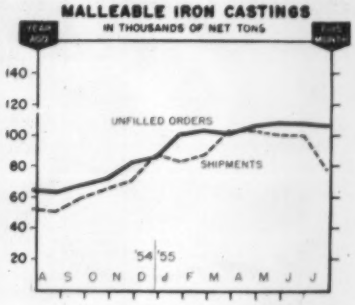
	Shipments 1955	Shipments 1954	Unfilled Orders* 1955	Unfilled Orders* 1954
Jan.	1,092	932	783	872
Feb.	1,106	936	852	865
Mar.	1,315	1,047	842	842
Apr.	1,294	995	966	826
May	1,310	943	938	775
June	1,296	987	982	804
July	1,070	821	1,050	829
Aug.	....	935	....	830
Sept.	....	921	....	811
Oct.	....	942	....	789
Nov.	....	997	....	760
Dec.	....	1,074	....	745
Total	....	11,530		

*For sale. U. S. Bureau of the Census

Charts copyrighted, 1955, STEEL

MALLEABLE IRON CASTINGS

IN THOUSANDS OF NET TONS



	Shipments 1955	Shipments 1954	Unfilled Orders* 1955	Unfilled Orders* 1954
Jan.	82.0	70.3	99.8	85.6
Feb.	86.0	69.1	101.8	81.6
Mar.	102.4	84.3	99.7	74.2
Apr.	101.2	74.5	104.1	69.1
May	98.4	67.9	106.4	67.0
June	99.5	72.8	107.6	60.2
July	76.0†	50.9	115.0	63.7
Aug.	....	59.3	....	62.5
Sept.	....	58.0	....	66.7
Oct.	....	64.3	....	71.1
Nov.	....	70.0	....	80.7
Dec.	....	87.9	....	85.1
Total	....	829.3		

*For sale. U. S. Bureau of the Census
†Preliminary

quarter of 1955 and on into 1956 is favorable. Unless there are economic or other unpredictable developments that are not now apparent, the company should continue to progress."

Charles C. Jarchow, president, American Steel Foundries, states that prospects for both shipments and earnings are good for the quarters ending Dec. 31, 1955, and Mar. 31, 1956. The 1956 fiscal year should show improvement over the year just ended (Sept. 30).

Shareholders of Townsend Co., producer of rivets, fasteners and cold formed parts, were told by President F. R. Dickenson that the company expects: "Demands for products in the coming 12 months will continue at a high level, particularly in the automotive and aircraft fields."

What Do You Think? . . .

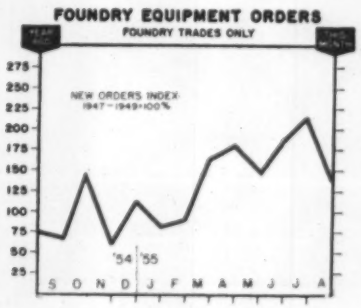
President George Spatta of Clark Equipment Co. says: "We expect the present high activity to continue for the balance of the year. On the whole we believe our prospects continue favorable and that the company and its employees will have a very good year."

Gardner-Denver Co. serves a diversified group of customers in oilfields, mining, construction and manufacturing. G. V. Leece, president, expresses this outlook: "The volume of incoming orders suggests that business for the remainder of the year will continue on the present high level. Our plans call for the purchase of additional machine tools and some manufacturing facilities in 1956 to handle increased volume."

Railroad Plans To Buy . . .

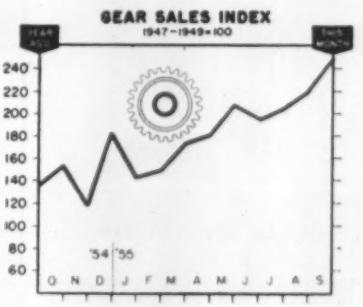
Translating confidence into action: The board of directors of the C&O Railway has authorized $28.4 million for improvements, new facilities and equipment. Included are 1000 coal hopper cars and 1000 gondolas for steel, ore and coal ($15.3 million worth). Also on the agenda are freight yard improvements and centralized traffic control. O.K.'d was construction of a $3.2 million coal dumping facility authorized earlier by the board's executive committee.

Those freight cars just authorized are in addition to other equipment costing $49.9 million, including 1500 coal hopper cars already ordered for delivery next year, 1000 boxcars and 80 locomotives now being received and another 80 locomotives to be received next year.



	1955	1954	1953
Jan.	81.0	173.8	99.6
Feb.	90.4	99.9	97.5
Mar.	163.6	82.7	132.2
Apr.	178.6	125.3	111.8
May	145.7	80.8	182.1
June	186.8	86.4	156.4
July	213.4	68.8	158.9
Aug.	134.0	75.6	235.5
Sept.	....	68.3	127.7
Oct.	....	147.5	87.1
Nov.	....	61.4	149.4
Dec.	....	113.9	160.8

Foundry Equipment Mfrs. Assn.



	1955	1954	1953
Jan.	140.9	167.4	161.4
Feb.	148.5	165.1	158.1
Mar.	172.8	128.6	158.9
Apr.	179.8	158.2	217.1
May	205.2	132.5	189.8
June	193.5	127.4	146.5
July	201.7	141.3	120.7
Aug.	217.6	154.7	121.6
Sept.	246.5	135.1	135.6
Oct.	....	152.3	211.1
Nov.	....	116.7	144.9
Dec.	....	182.2	194.0

American Gear Mfrs. Assn.

Industry Turns On the Heat . . .

The Industrial Heating Equipment Association indicates the industry is continuing to boom. September orders for industrial furnaces were well over three times those of a year ago. To date, 1955 business is almost double that of 1954, announces Carl L. Ipsen, IHEA executive vice president.

Induction heating equipment sales continue at a lively pace, too. September's business was two and one-half times last year's. To date, orders are 173 per cent ahead of those at this time last year.

Full Speed Ahead, Say PAs . . .

Purchasing agents find conditions in October indicate good business well into 1956. At the end of October, 95 per cent of the Business Survey Committee of the National Association of Purchasing Agents reported: Production as high or higher than September's. Almost as many (93 per cent) said new order position was the same or better.

Employment is highest since mid-1950. PAs indicate: Needs high, workers scarce, with a great shortage of trained engineers and skilled workmen.

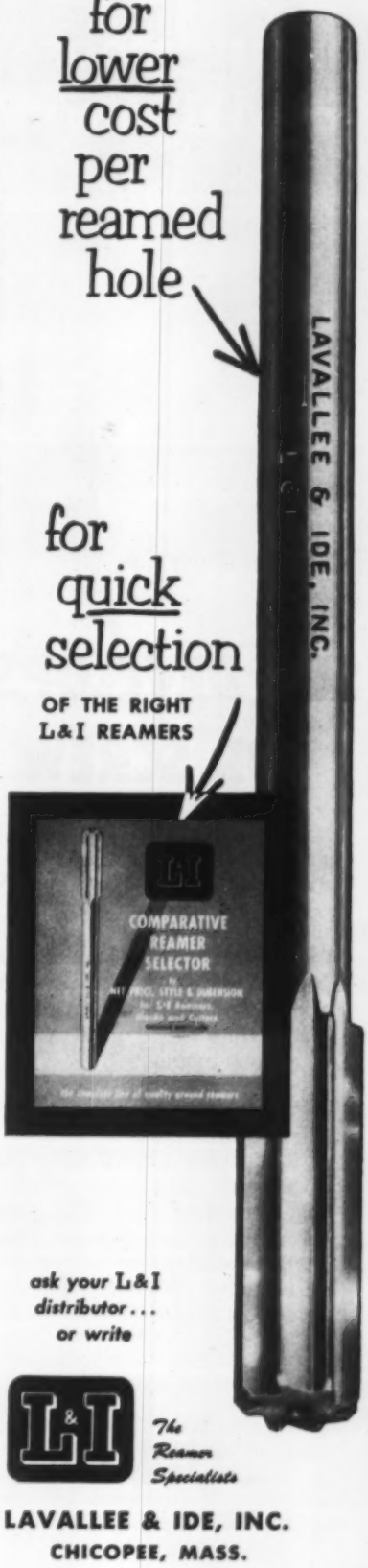
A fourth report higher inventories—protection against raw material shortages, forward buying of scarce items and an acceleration to match increased sales and production are reasons.

Buying policy: About half are in the 90-day-and-over range. For capital goods, 77 per cent are in that category.

The consensus shows any inclination to resist inflationary price trends in some scarce items is tempered by the realism of having to purchase for highly expanded business needs.

Trends Fore and Aft . . .

Contracts for heavy construction let so far in 1955 are practically equal to the total for all of the record year, 1952, reports *Engineering News-Record* . . . Volume in the gearing industry increased 13.3 per cent in September over August, notes the American Gear Manufacturers Association . . . Sales of GM passenger cars set another all-time record in the second ten days of October . . . Consumers are still expanding their purchases, says the Commerce department . . . Resistance Welder Manufacturers' Association reports new orders up 36 per cent in first nine months over a year ago.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for quick selection
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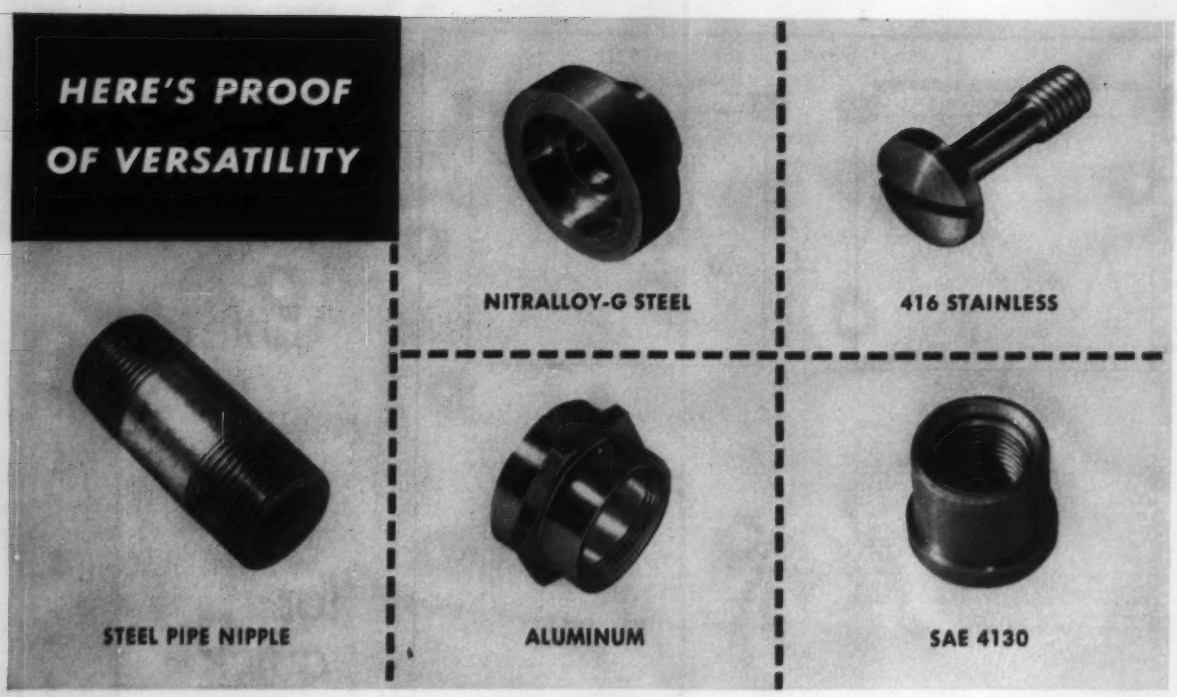

SUN DEVELOPS VERSATILE NEW CUTTING OIL FOR SCREW MACHINES AND JOB SHOPS

New cutting oil, Sunicut 5534, is moderately priced... gives excellent machining results on wide range of steels

New Sunicut 5534 is a non-emulsifying, transparent cutting oil specially compounded to give above-average machining results to operators who want a single oil to machine a large variety of ferrous metals.

Tests have proved that new Sunicut 5534 meets this demand for an all-purpose cutting oil. It is ideal for general screw machine and turret lathe work. It is also excellent for tapping, drilling, threading, and light stamping operations. In addition, new Sunicut 5534 can be used on many special machining jobs, both high and low speed, with metals ranging from B1112 to 4130 as well as free-machining stainless steels.

For complete information about new Sunicut 5534 and how it can help you reduce your oil inventories... lower your production costs... see your Sun representative. Or write SUN OIL COMPANY, Phila. 3, Pa., Dept. S-11.

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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY, PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

LEON WEINTRAUB
. . . Eastern Brass & Copper works mgr.

ARTHUR G. BIGNALL
. . . president of Lasalco Inc.

DAVID S. JENNINGS
. . . Central Screw president-treasurer

Leon Weintraub was appointed works manager, **Eastern Brass & Copper Co. Inc.**, New York. He is in charge of the production program as well as quality control and methods systems. Mr. Weintraub was works manager of National Silver Co.

United States Steel Corp., Pittsburgh, appointed **R. Conrad Cooper** vice president, administration planning, to assist in development and application of over-all programs and policies. **John E. Angle**, general superintendent at the Gary, Ind., sheet and tin mill, succeeds Mr. Cooper as vice president, industrial engineering.

Andrew L. Pontius was made general manager of Illinois Tool Works' **Shakeproof Division** operations at Elgin, Ill.; **Silas S. Cathcart** assumes the same post at Shakeproof's special products division in Des Plaines, Ill. The Shakeproof Division, to be consolidated at the St. Charles Road plant at Elgin, will include engineering, manufacturing and sales of standard parts.

Goff Smith was elected president of **Griffin Wheel Co.**, Chicago, a subsidiary of American Steel Foundries. He was executive vice president and succeeds **Edmund Q. Sylvester** who resigned to establish a wheel manufacturing business in South Africa.

Arthur G. Bignall was elected president of **Lasalco Inc.**, St. Louis. Formerly vice president, he succeeds **Herman Struckhoff** who resigned to establish a metal finishing supply company on the West Coast and will represent Lasalco's line of electroplating equipment. **Norman K. House**, former chief engineer, was elected vice president.

D. M. Hallier was appointed manager of cutting tools, **Motch & Merryweather Machinery Co.**, Cleveland. He will direct operations of both the cutting tool distributor division and the cutting tool manufacturing division. He has been manager of the latter division since 1949.

Sidney E. Leese was appointed chief engineer of **Houdaille-Hershey Corp.'s** automotive division in Buffalo. He was with Bendix Aviation Corp.

Donald E. Stoops was made manager of distributor sales, transmission division, **Clark Equipment Co.**, Jackson, Mich.

Reginald Whitson was made West Coast regional manager at Pasadena, Calif., for **Warner Electric Brake & Clutch Co.** He succeeds **Vernon D. Enwald**, now midwestern regional manager. **Wesley E. Timmcke** was made southern regional manager, Atlanta.

Central Screw Co., Chicago, elected **David S. Jennings** president and treasurer; **Ross B. Warren**, executive vice president and assistant treasurer; **Ernest Payne**, vice president-sales; **Ray E. Nelson**, secretary; and **Walter E. Grandstrand**, assistant secretary.

George F. Haback was elected vice president - engineering, **Worthington Corp.**, Harrison, N. J. His responsibility for the engineering activity includes research and development. **Harry A. Feldbush**, former vice president-engineering, will continue as consultant on special engineering problems.

Charles S. Beshore, director of system and procedures for **Automatic Transportation Co.**, Chicago, was promoted to director of purchases. He succeeds **Carle J. Blakeslee**, retired.

John W. Rogers, in addition to duties as sales manager, was made director of sales and engineering for **Wean Equipment Corp.**, Cleveland. **Albert J. Sarka** was named chief development engineer, **Kenneth R. Keska** chief engineer.

International Resistance Co., Philadelphia, appointed **Guy B. Entrekin** manager of its new plant at Burlington, Iowa. He was chief product engineer.

Harold G. Leibold was made sales

EVERETT N. SIEDER
marketing mgr., Alco thermal products

ROBERT G. WINGERTER
. . . gen. mgr., Timken automotive div.

HARVEY B. WILGUS
. . . Electric Products gen. sales mgr.

manager of refractories for **Cleveland Quarries Co.**, Amherst, O.

Everett N. Sieder was made marketing manager of thermal products, **Alco Products Inc.**, Schenectady, N. Y. He was manager of thermal product planning.

T. Coolidge Sherman succeeds the late **Harold N. Arbuthnot** as Washington representative for **Allegheny Ludlum Steel Corp.**

Leonard H. Glasgow, William A. Hattman and **J. B. G. Roberts** head production planning units at **Pittsburgh Steel Co.** Mr. Glasgow becomes superintendent, schedules and service, Monessen, Pa., Works; Mr. Hattman, superintendent, sheet mill schedules and service, Allenport, Pa., Works; Mr. Roberts, superintendent, tube mill schedules and service, Allenport.

Southern Peru Copper Corp., New York, elected **Edward Tittmann** president and chief executive officer. He was general manager, western department, American Smelting & Refining Co.

Northrop Aircraft Inc., Hawthorne, Calif., named **Frank W. McNab** chief of quality control and **Don L. Vivrette** manager of contract administration.

Cutler-Hammer Inc., Milwaukee, appointed **E. B. Fitzgerald** division manager, responsible for the sale of mill and heavy industry controls.

Robert G. Wingerter was made general manager, automotive division, **Timken Roller Bearing Co.**, at Detroit. He succeeds **Edgerly W. Austin**, who retires from that position but will serve as consultant at the Detroit office.

Louis S. Foulkes Jr. was elected president of **Vogt Mfg. Co.**, Rochester, N. Y. He succeeds **Raymond A. Lander**, now chairman.

Warren Carhart was made sales manager, **Texas Alloy Products Co.**, Houston. He was general manager of the southwestern gear division of Western Gear Co.

In the Danville, Ill., plant, central foundry division, **General Motors Corp.**, **Dale Wonus** was made superintendent of the malleable shell department.

Col. Charles A. Reif was elected chairman and **Robert C. Sanderson** president and general manager of **Reif-Rexoil Inc.**, Buffalo.

J. D. Harmison is now manager, parts sales, for the tractor group of **Allis-Chalmers Mfg. Co.**, Milwaukee.

William L. Pelz was made Cincinnati district sales manager, steel and tubes division, **Republic Steel Corp.**

Walter Kassebohm was elected president of **Marchant Research Inc.**, subsidiary of Marchant Calculators Inc. at Oakland, Calif.

Harvey B. Wilgus was appointed general sales manager, **Electric Products Co.**, Cleveland. He was general sales manager, Redmond Co. Inc.

Named to a new executive management committee of **Prudential Industries Inc.**, Philadelphia, are: **Oliver J. R. Troup**, president; **Edward Rexer**, executive vice president-operations; and **Jack Troup**, vice president-treasurer. **Oliver J. R. Troup Jr.** was made vice president-general manager of Atlas Chain & Mfg. Co., a subsidiary. **John A. Troup II** was made vice president-general manager of Atlas Precision Products Co., a division.

Robert McC. Maxwell was elected executive vice president of **Chandler Boyd Co.**, Pittsburgh, jobber of mill supplies. **James L. Perrott** was made sales manager.

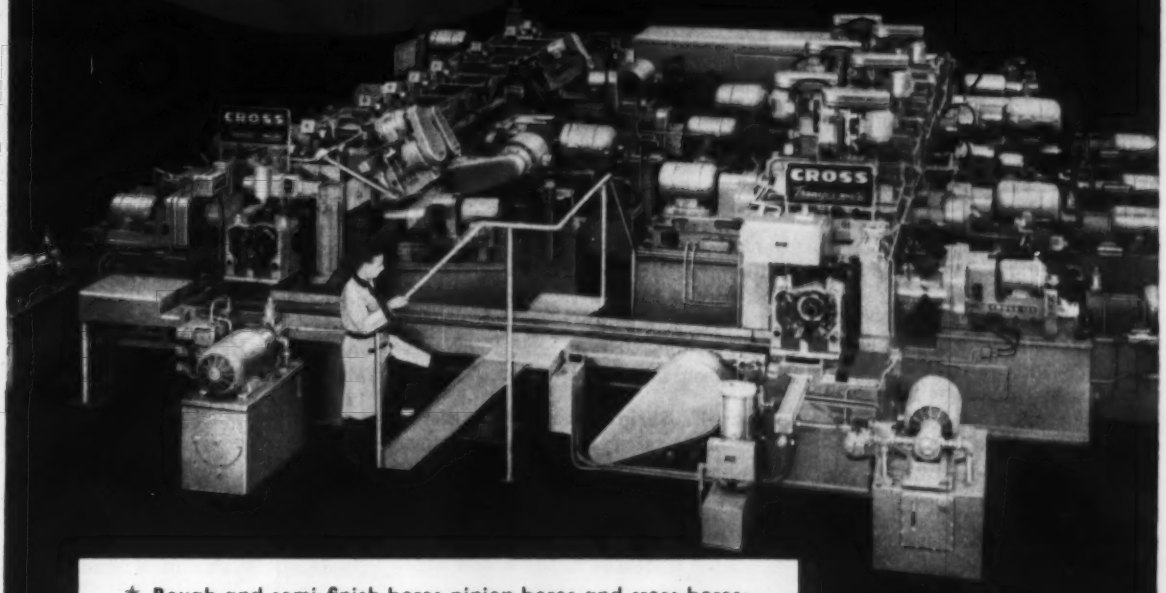
M. E. Young succeeds **A. A. Piper**, resigned, as Chicago district manager, **Electric Controller & Mfg. Co.** Mr. Piper will act as consultant in the Chicago area.

Vincent Barreca, president of Canadian Admiral Corp., was appointed to the new post of vice president-operations of the parent company, **Admiral Corp.** He will have headquarters in Chicago and retains his Canadian affiliation.

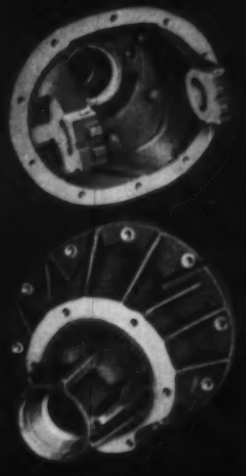
Allen S. Johnson joined the electronics division of **Thompson Products Inc.**, Cleveland, as assistant to the division manager, a new

Mills, Drills, Bores, Turns Differential Gear Carriers

Another Transfer-matic by Cross



- ★ Rough and semi-finish bores pinion bores and cross bores; rough and finish faces and turns pilot diameter of torque tube flange; mills faces of cross bore bosses; spotfaces flange mounting holes; drills, chamfers, reams and taps all other holes except flange holes.
- ★ 115 pieces per hour at 100% efficiency.
- ★ 73 operations: 8 milling, 8 boring, 2 crossfacing, 1 turning, 18 drilling, 10 spotfacing, 7 chamfering, 2 reaming, 9 tapping, 8 probing.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Palletized work holding fixtures with hydraulically operated torque wrenches for clamping and unclamping parts.
- ★ Washing and drying unit for cleaning fixtures between last cutting station and loading station.
- ★ Other features: Construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; automatic lubrication system.



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WILLIAM F. WOLF
. . . Harron, Rickard & McCrone v. p.

JACK WHITESIDE
. . . heads Simpson Electric Division

CALVIN H. COREY
. . . Brooks & Perkins v. p.

post. For the last 12 years he was with Webster-Chicago Corp.

William F. Wolf was elected vice president and manager, machine tool division, **Harron, Rickard & McCone of Southern California,** Los Angeles. He is former owner of W. F. Wolf Machinery Co., machine tool distributing firm.

Elbert M. Foudray was made manager of sales in charge of the Portland, Oreg., office of **Columbia-Geneva Steel Division,** U. S. Steel Corp.

Vincent V. Tivy was appointed chief application engineer for **Foxboro Co.,** Foxboro, Mass.

Ralph E. Campbell was made Pittsburgh district manager, **SKF Industries Inc.** He was field engineer in the same office.

Jack Whiteside, general manager, **Simpson Electric Co.,** Chicago, was promoted to vice president of the parent company, American Gage & Machine Co., in charge of the Simpson Electric Division.

John T. Obrig was named eastern regional sales manager, heating and cooling division, **Union Asbestos & Rubber Co.** He has headquarters in New York.

Walter E. Nolan heads a new aluminum sales division of **Hawkridge Bros. Co.,** Boston, a distributor of Kaiser Aluminum & Chemical Corp.

J. E. Zollinger, director of defense contracts, **International Business Machines Corp.,** New York, was promoted to executive assistant to the vice president-sales, in charge of sales research and planning.

Brooks & Perkins Inc., Detroit, elected **Calvin H. Corey** vice president, responsible for liaison work between the company and atomic industry. For the last eight years he has been manager of B&P's Washington office, a position he retains.

George W. Porter, manager at Seattle for the reinforcing products department of **Joseph T. Ryerson & Son Inc.,** transfers to Spokane, Wash., in a similar capacity. He is replaced at Seattle by **Claude V. Baker.**

Henry C. Curtis was made director of domestic industrial engineering and production control for **Burroughs Corp.,** Detroit. He succeeds **Robert A. Atkins** who was appointed director of overseas manufacturing, a newly created staff position.

OBITUARIES . . .

George W. Duncan, 56, sales manager, **Ohio Electric Mfg. Co.,** Cleveland, died Oct. 25.

Harold H. Cheney, 56, former plant manager, **Logan Gear Co.,** Toledo, O., died Oct. 17.

Louis C. Hyatt, 64, former works manager, **Consolidated Car Heating Co.,** Albany, N. Y., died Oct. 20.

Frederick E. Munschauer, 70, president and general manager, **Niagara Machine & Tool Works,** Buffalo, died Oct. 22.

William B. Fageol, 75, retired executive vice president, **Twin Coach Co.,** Kent, O., died Oct. 24.

Wilbur C. DeGraff, 57, for the last 30 years a sales engineer for **Warner & Swasey Co.,** Cleveland, died Oct. 24.

Otto Paschkes, 70, president, **Astron Mfg. Corp.,** East Newark, N. J., died Oct. 25.

David Loveman, president, **D. Loveman & Son Inc.,** Cleveland, died Oct. 26.

Dr. Aaron B. Bagsar, 58, retired chief metallurgical engineer, **Sun Oil Co.,** Philadelphia, died Oct. 7.

Blaine S. Smith, retired president, **Universal Atlas Cement Co.,** U. S. Steel Corp., died Oct. 27.

Martin A. Fisher, executive vice president, **Standard Buffalo Foundry Inc.,** Buffalo, died Oct. 25.

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for this new Model C Autometric precision boring machine when put to work in your plant with...

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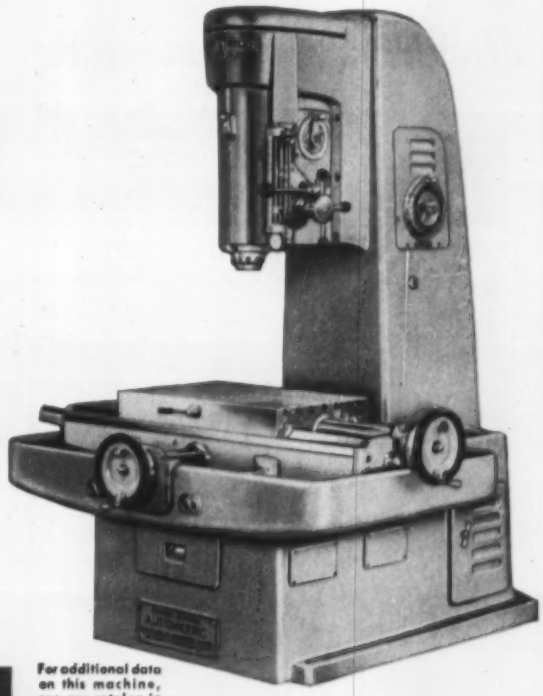
TOOL-LEASE PROGRAM

THINK of it! You can lease this new Model C Autometric boring machine for as little as 59 cents per hour! It's an exceptionally low price to pay for this modern, high precision-built boring machine, designed specifically for performing the most exacting operations in your toolroom, laboratory or shop.

Under Plan "A," one of three possible lease agreements, you make two semi-annual payments, totaling 25% of the machine's price during each of the first three years. And only 10% during each of the last four years. What's more, this lease agreement permits you to terminate or purchase your Model C Autometric at the end of the third year or at the end of any year thereafter.

Under Kearney & Trecker's Tool Lease program you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.



For additional data on this machine, see our catalog in Sweet's.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

Precision Mechanisms Industry—Includes machines for laboratory, scientific and engineering instruments; mechanical measuring, controlling instruments; optical, surgical; medical, dental instruments and equipment; photographic equipment; watches, clocks, clockwork devices, and parts. Of the total 8,295 machines, 10% are over 20 years old, over 36% are 10 to 20 years old.10 to 20 years old.

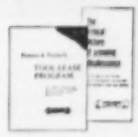
TOOL LEASE
KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS
EQUIPMENT ®

	Machines over 20 years old, which should definitely be replaced.	Machines 10-20 years old, which should probably be replaced.	Machines less than 10 years old.
882 automatic and manufacturing type milling machines	[illegible]	43%	44%
2550 vertical milling machines	[illegible]%	30%	66%
4087 knee type horizontal milling machines	[illegible]	40%	45%
380 bed type milling machines		31%	69%
396 horizontal and vertical precision boring machines	[illegible]%	23%	74%

Figures adapted from 1953 American Machinist survey of Metalworking Industry.

KEARNEY & TRECKER CORP.
6784 W. National Ave., Milwaukee 14, Wis.

Please send me Bulletin TL-10A on Tool-Lease Program and booklet titled "Critical Picture of Creeping Obsolescence."



Name.....

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City..... Zone..... State.....

POTTER & JOHNSTON

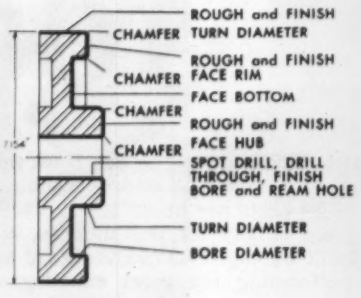
4-U AUTOMATIC TURRET LATHE

Handles TOUGH STEEL FORGINGS

Quickly . . . Economically

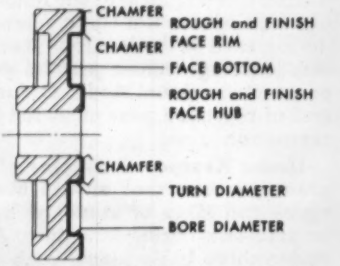
Jobs like machining this change gear blank, forged from 6150 steel, including boring the 1⅛" hole ***from the solid***, are easy, fast, profitable. That's because the P&J 4-U is a ***modern*** machine with the advanced design, added rigidity, and extra speed and power to take today's tough steels in stride.

WITH TOOLING ENGINEERED BY P & J EXPERTS



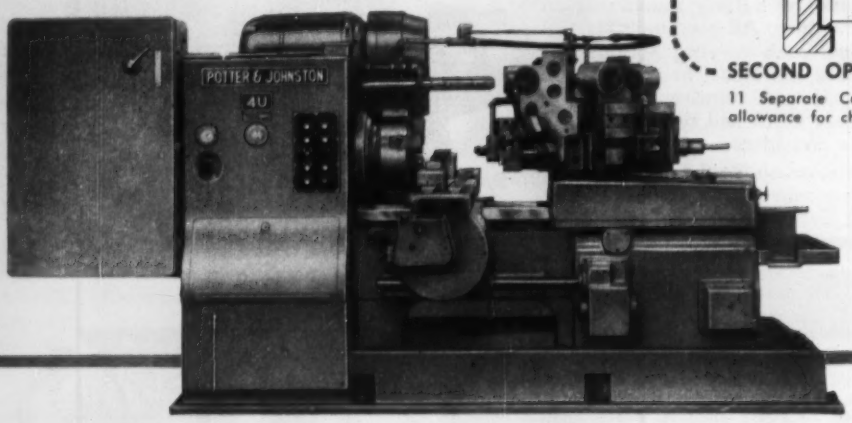
FIRST OPERATION

17 Separate Cuts, 3.41 minutes including allowance for chucking



SECOND OPERATION

11 Separate Cuts, 2.56 minutes including allowance for chucking



MODERNIZE with POTTER & JOHNSTON REPLACE FOR PROFIT

TAKE ADVANTAGE OF DIRECT-FACTORY SERVICE

To serve you best, all P&J Automatics are made available to you through Potter & Johnston and Pratt & Whitney direct-factory Representatives. For full information on the 4-U and other P&J Automatics—plus expert application engineering—phone or write the P&W Branch Office conveniently near you.

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BRANCH OFFICES • BIRMINGHAM • BOSTON • CHICAGO • CINCINNATI CLEVELAND • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA PITTSBURGH • ROCHESTER • SAN FRANCISCO • ST. LOUIS • EXPORT DEPT., PAWTUCKET, R. I. • AGENT: HOUSTON, WESSENDORFF, NELMS & CO.

PRECISION PRODUCTION TOOLING P&J **FOR MORE THAN FIFTY YEARS**

Wide Flange Beams Roll from New Mill

Inland Steel enters new field as its Indiana Harbor facility begins production of sections which are in strong demand from builders of a wide variety of structures

WIDE FLANGE beams are being rolled on Inland Steel Co.'s new semiautomatic mill at its Indiana Harbor Works.

Current production is limited to trial runs on 8, 10 and 12-in. sections. The size range is 8 to 24 in.

Electronic devices include automatic controls which can be preset to adjust the position of the rolls. The operator is freed from some of the manual operations required by older mills.

The new facilities were built by revamping the plant's 28-in. structural mill, which had a rolling record spanning two world wars. New machinery and equipment were installed, some facilities were relocated and several building extensions were built.

One-Man Operation — Heart of the operation is a 44-in. universal beam mill and a 34-in. edging mill, operated in tandem by one operator. A new 6000-hp electric motor was installed to drive them.

Other new equipment includes a 40-in. finishing mill, a 175-ton crane, a 66-in. hot saw and a 66-in. cold saw, a gag press and a roller straightener.

A 220-ft building extension was erected to store wide flange beam rolls; another building was extended 220 ft; and a 640-ft warehouse building was built to house the finishing processes.

Varied Products — The new equipment makes the 28-in. structural mill one of the most versatile in the country, company officials claim. A variety of products is possible mainly because interchangeable roll housings can be made up in advance of rolling schedules. The new wide flange beam mill housing can be picked up by the 175-ton crane and transported out of the way when other products are scheduled for rolling.

Wide flange beams are used extensively in all types of structures and are in growing demand by builders because of their greater strength in relation to weight. Advantages stem from uniform flange thickness from center to edge. Strength, rigidity and resistance to twisting are increased. Longer spans are possible, so greater floor areas can be planned without intermediate support. The product is used widely in highway bridges and overpasses, in one-story industrial buildings, schools and hospitals.

Ford To Build Parts Plant

Ford Motor Co., Dearborn, Mich., will build a 600,000-sq-ft parts manufacturing plant 4 miles southeast of Ypsilanti, Mich. John S. French, general manager of the Parts & Equipment Mfg. Division, says the new facility will be known as the Rawsonville plant. Production will start in a portion of the plant by late 1956.

Buys Hufford Machine Works

Hufford Machine Works Inc., El Segundo, Calif., has been purchased by a group organized by William Husted, New York. Hufford Machine Works makes machines and equipment for the aviation and electronic industries. President of the West Coast company is M. L. Bengtson; vice president in charge of sales is K. M. Crawford. All former officers remain with the company.

Warehouse Changes Hands

Federated Steel Corp., Pittsburgh, sold its Fort Duquesne Steel Co. division to a corporation headed by J. F. Lott, president of Fort Duquesne Steel. Mr. Lott is president and treasurer of the new company, which retains the same name; E. G. Sheasby is vice president-sales; G. A. Krebs, assistant treasurer.

Federated will change its name to Lott Co. and will diversify its interests. It will continue its activities in the steel and aluminum warehouse business through its ownership of Morrison-Drabner Steel Co., Cincinnati, and a minor-

(*Please turn to page* 118)

tough sprayed metal

well-known maintenance method now profitable production process

equipment fabricators find tough, high-quality sprayed metals build big bonus pay-offs

Modern metallizing—metal spraying—which for many years has saved millions of maintenance dollars by restoring worn machine parts for thousands of companies, is now helping many others improve their products, cut production costs.

In the production of new equipment, tough sprayed metal coatings provide highly desirable mechanical or electrical characteristics at low cost, in high speed, semi-automatic production.

General Electric, for example, a long-time user of metallizing to provide superior wearing qualities on critical areas of large turbine shafting, now applies sprayed metals to a wide range of its products. Many forward-looking companies have instituted investigative programs in their research and design labs to explore the use of metallizing as a means of giving their products competitive advantages in quality, or performance or price—or all three.

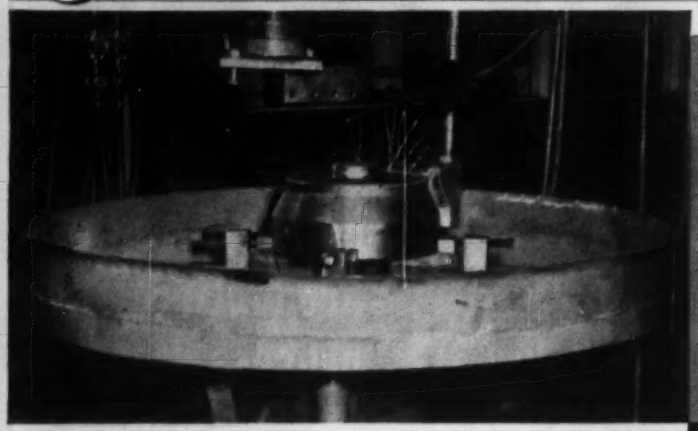
Metallizing may be able to help your company improve its products, economically, reduce machine maintenance costs, cut your bills for corrosion protection. It may pay you well to look into it. In any event you will find it a fascinating subject. Bulletin 51 illustrates and describes "Metallizing—its practical applications"—shows actual work being done in users' shops. We shall be happy to send you a copy.

METCO

Metallizing Engineering Co., Inc.

1167 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300 • Cable: METCO
In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD. — Chobham near Woking, England

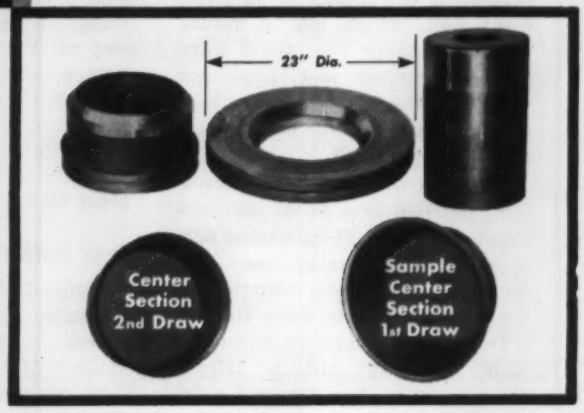
The MEEHANITE® Casting Reporter



Flame hardening set-up for hardening Meehanite dies prior to chrome plating.

FLAME HARDENED MEEHANITE DIES PRODUCE JET ENGINE PARTS

Cockshutt Aircraft Limited, Renfrew, Ontario, manufacturers of jet engine components, have found the use of flame hardened Meehanite dies are the all-'round answer to better performance in service in the production of pressed parts and a superior finished product.



Meehanite punch-draw and pressure rings; chrome-plated for second draw on 600-ton Dominion Hydraulic Press. Flame tube center section.

Builder says:

"In producing parts for jet engine combustion systems, we have found that flame hardened Meehanite metal dies are far superior to those made from ordinary gray iron castings when used on hydraulic or mechanical presses.

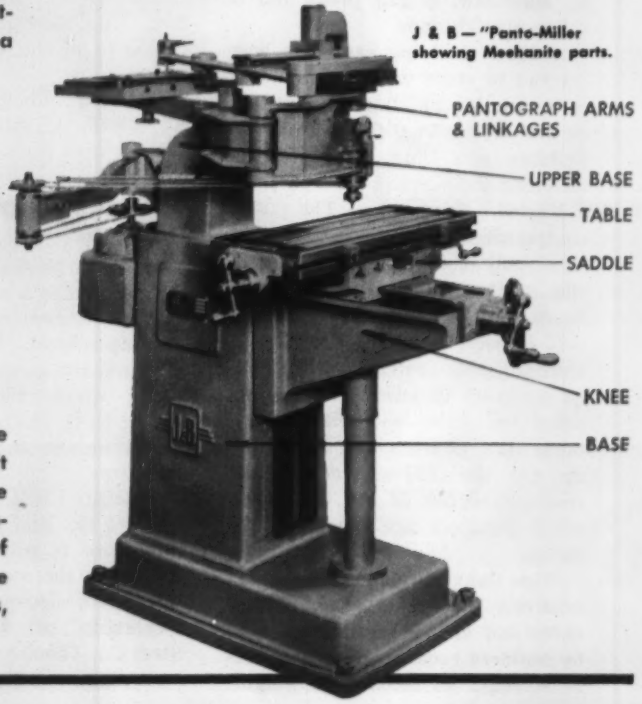
The rings and punches made from flame hardened Meehanite metal for use on our Cincinnati Hydroform Presses are equal in performance to those made from far more costly materials.

For further improvement and to avoid scores and scratches during drawing operations, it is found beneficial to hard chrome plate the work surfaces of the die, but it is important that the die is hardened before plating to reduce peeling or chipping of the chrome to a minimum."

J&B "PANTO-MILLER"

Another Precision Tool Specifying Meehanite Components

Johnson & Bassett, Inc., Worcester, Massachusetts, build a 2-dimensional pantograph engraver known as the "Panto-Miller". Designed for versatility, precision and efficient production, this unit incorporates Meehanite castings for all major, vital parts.

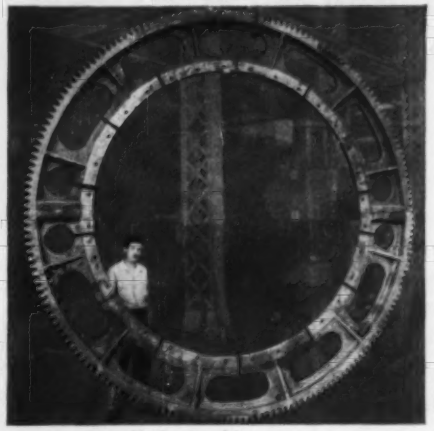


J & B — "Panto-Miller showing Meehanite parts.

Builder says:

"Our use of Meehanite castings in general is due to the excellent machinability, tensile strength and rigidity. It is important to our Panto-Miller that we have these three features, plus the important feature of vibration absorption. Our machine is a duplicating machine and, of course, must be extremely accurate and we require the best materials available as insurance against blow holes, distortion, etc."

Industries report what Meehanite Castings have done for them



Meehanite drive gear.

RUGGED HARDINGE GRINDING MILLS BUILT WITH MEEHANITE CASTINGS

The name "Hardinge" has long been famous in those fields where the grinding or pulverizing of all types of materials is a basic requirement. As manufacturers of the highly successful Conical Grinding Mill, the Hardinge Manufacturing Company, York, Pennsylvania, materials specifications call for maximum properties and service life and Meehanite castings are used for important basic components. These include:

1. Mill Shell • 2. Trunnions • 3. Gear Ring and Gear • Main Bearings

Builder says: "We undertook the manufacture of Meehanite castings in our foundry some years ago, not only as a means of improving foundry efficiency and quality of castings, but in order to produce cast components such as these which will provide maximum wear resistance, high strength and toughness and the uniformity of these properties which enables us to assure our customers that they are buying a *better* product when they buy from Hardinge."

Meehanite grinding mill shell.

Mill bearings are Meehanite castings.

ONLY A MEEHANITE FOUNDRY CAN MAKE MEEHANITE CASTINGS

The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington and Dover, New Jersey
Blackmer Pump Company	Grand Rapids, Michigan
Compton Foundry	Compton, Calif.
Continental Gin Co.	Birmingham, Alabama
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio & Grove City, Pa.
Crawford & Doherty Foundry Co.	Portland, Oregon
DeLaval Steam Turbine Co.	Trenton, New Jersey
M. H. Detrick Co.	Newark, N. J. and Peoria, Ill.
Empire Pattern & Foundry Co.	Tulsa, Oklahoma
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Georgia Iron Works Co.	Augusta, Ga.
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Hardinge Company, Inc.	New York, New York
Hardinge Manufacturing Co.	York, Pennsylvania
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Koehring Co.	Milwaukee, Wisconsin
Lincoln Foundry Corp.	Los Angeles, California
Palmyra Foundry Co., Inc.	Palmyra, New Jersey
The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co.	Dover, Ohio
Sonith Industries, Inc.	Indianapolis, Ind.
Standard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
Valley Iron Works, Inc.	St. Paul, Minnesota
Vulcan Foundry Company	Oakland, California
Washington Iron Works	Seattle, Washington
CANADA	
Hartley Foundry Division— London Concrete Machinery Co., Ltd.	Brantford, Ontario
E. Long Ltd.	Orillia, Ontario
Otis Elevator Co., Ltd.	Hamilton, Ontario

Write for your copy of ***"The Handbook of Meehanite Metals"***

This Advertisement Sponsored by Foundries listed above

MEEHANITE METAL® CORP.

714 North Ave., New Rochelle, N. Y.

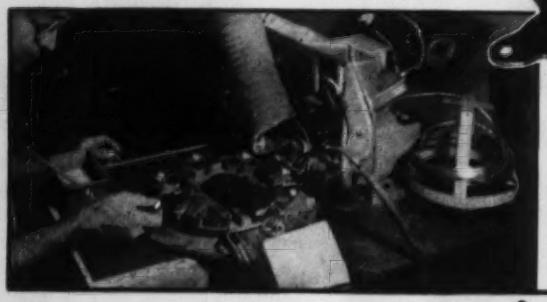
EASY-FLO brazed construction

the ☆EASY... ☆FAST... ☆LOW-COST WAY...

...TO MAKE PARTS LIKE THESE...

Thousands of small parts are now made of stampings and screw machine parts joined with the low-temperature silver brazing alloy EASY-FLO. This construction provides one-piece strength and is surprisingly economical – especially when a production setup is used that *automationizes* the actual brazing.

Victor Adding Machine Co., Chicago, makes quite a few parts the EASY-FLO brazed construction way. Here you see some typical examples.



Bushing is induction brazed to case hardened stamping on turntable fixture with EASY-FLO 45 wire automatically fed and positioned at joints. Operator merely loads parts. Time per assembly – 3½ seconds – 500 per hour.

Frame above is made by brazing side pieces to rods on induction coil setup shown. Output of 120 frames (480 joints) per hour is easily maintained. At left – a few other parts similarly produced.

Expert brazing production know-how at your call

To users of EASY-FLO and SIL-FOS silver brazing alloys, and to designers and production men considering their use, we offer full cooperation in working out joint designs and fast production procedures. Ask for a field engineer to call.

For full EASY-FLO and SIL-FOS facts in print write today for Bulletin 20.

HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

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Die Handler Lifts Truck

Lifting a giant fork truck is child's play for this mammoth die handler. Designed and built by Automatic Transportation Co., Chicago, it can lift up to 110,000 lb. It is equipped with two winches for handling 55-ton dies into and out of metalworking presses

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(*Concluded from page* 115)

ity interest in Fort Duquesne Steel Co.

J&L Dedicates Texas Plant

Jones & Laughlin Steel Corp., Pittsburgh, dedicated its Container Division plant at Port Arthur, Tex., on Nov. 5.

Watson Industries Formed

Ervin J. Wilee and Clifford W. Hoye organized Watson Industries Inc.—moldings, stampings and wire products. Headquarters are at 7405 Lyndon Ave., Detroit 38, Mich.

Kyle & Co. Changes Hands

Pittsburgh - Des Moines Co., Pittsburgh, purchased Kyle & Co., Fresno, Calif., steel fabricator and distributor. Kyle has plants in Fresno, Stockton, Sacramento and El Monte, Calif.

Koppers Enters New Field

Koppers Co. Inc., Pittsburgh, purchased Turner & Haws Engineering Co. Inc., West Roxbury, Mass., maker of a special line of

"Maybe we'd better scrap some of our ideas about scrap?"

DO YOU think of your scrap in terms of material costs only? Actually it's the time and labor that have been wasted upon it that is really costly.

Accepting an arbitrary rejection rate as inevitable, is expensive and usually unnecessary. The solution is often so simple it can be easily overlooked.

This may be the solution

Cracks in parts are one main cause for scrapping. When these cracks are not discovered until after machining or at final inspection, time spent in processing the parts is a dead loss!

Inspection with Magnaflux' Methods finds all cracks—from whatever cause—at any stage of manufacture. By finding cracks early you can correct the cause before parts are run in quantity. Result: almost no time or money is wasted on defective parts.

Inspection with Magnaflux is fast and cheap—saves many times its trifling cost. Ask to have a Magnaflux engineer show you how it can cut *your* costs—or write for new booklet on LOWER MANUFACTURING COST.

MAGNAFLUX

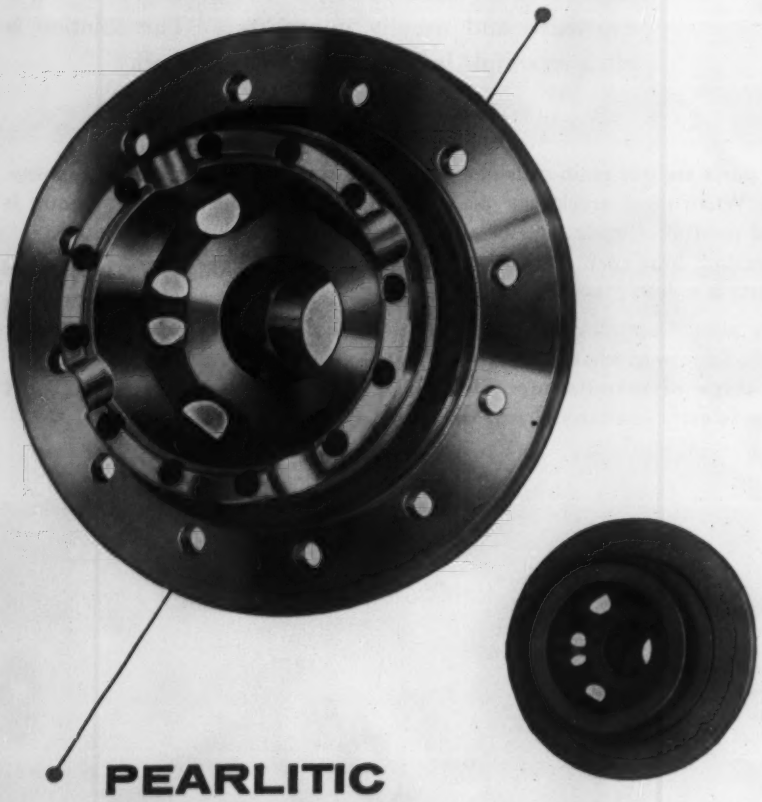
MAGNAFLUX CORPORATION

7313 W. LAWRENCE AVENUE, CHICAGO 31, ILLINOIS

New York 36 • Pittsburgh 36 • Cleveland 15

Detroit 11 • Dallas 19 • Los Angeles 58

MACHINABILITY INDEX 80-90*



PEARLITIC MALLEABLE CASTINGS

*B1112 STEEL = 100

Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

But pearlitic malleable castings—from National—don't stop there. They have great ultimate strength . . . resist wear under heavy loads at high speeds . . . make excellent non-seizing bearings . . . can be air or liquid-quenched . . . can be smooth-finished.

Don't overlook the advantages of pearlitic malleable. For pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase the sales potential of your product. AA-1906

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

filters for cleaning industrial air and gas. Operation of the property will be under Koppers' Metal Products Division at Baltimore, manufacturer of electrostatic precipitators for cleaning industrial gas.

Fruehauf Gets Mobilvan Rights

Fruehauf Trailer Co., Detroit, has been granted exclusive manufacturing and distribution rights for Clark Equipment Co.'s Mobilvan system, a method for transporting large container shipments of merchandise. The system is based on the use of Clark fork lift trucks designed to automatically lock a van or container securely to the bed of a railroad flatcar or the chassis or flatbed of a trailer or truck.

Union Malleable Expanding

Union Malleable Mfg. Co. completed its new foundry at Ashland, O., the first phase of its planned $8-million plant expansion program. The next step: A 55,000-sq-ft section to house the electric annealing and automatic galvanizing operations and machine shop facilities. It will be started next year.

Topp Industries Builds

Topp Industries Inc., maker of aircraft instrumentation, air-borne and ground-support systems, built two plants at 5200 E. 102nd St., Los Angeles, to triple production capacity.

Yale & Towne Buys Plant

Yale & Towne Mfg. Co., New York, purchased a plant at Addison, Ill., to be added to the facilities of its Powdered Metal Products Division, Franklin Park, Ill. It will be devoted principally to the production of ferrite components used by the manufacturers of radio, television and other electronic equipment. Transfer of Yale & Towne's ferrite operations to the new plant will make available the greater production capacity needed to meet increasing demands of the electronics industry.

The company opened a new sales and service center at its branch at

Doubling Univac's Speed!

The famous Remington Rand Univac® has widened even further its lead over other electronic business computing systems. Univac is still the *only* completely self-checked system...the only one which can read, write, and compute simultaneously without extra equipment. And now, the Univac II adds to these superior features the speed of a magnetic-core memory.

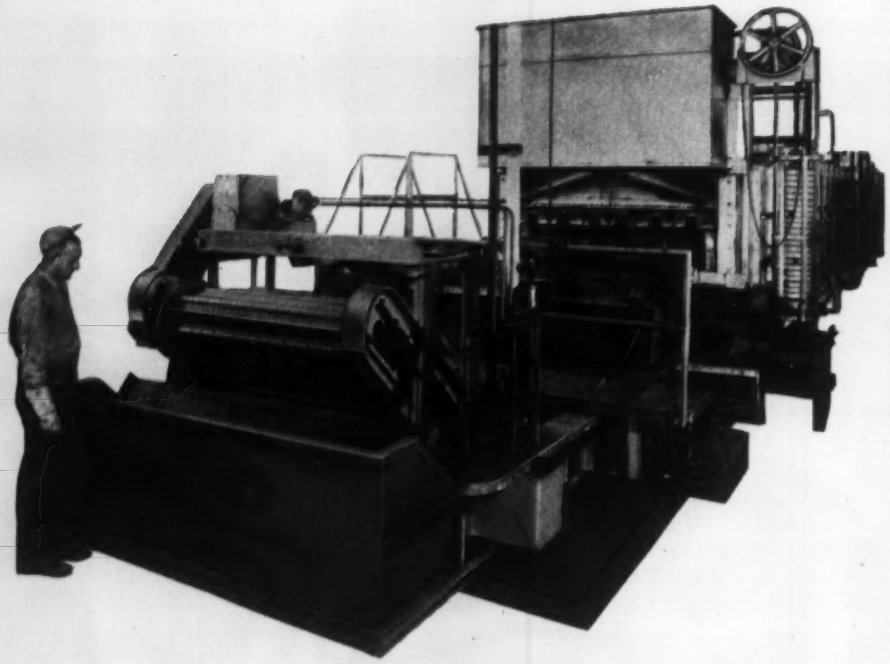
The Remington Rand magnetic-core memory is more than a laboratory promise. It has been in actual customer use for over a year, passing all tests with flying colors in the first commercially available electronic computer to use core storage successfully.

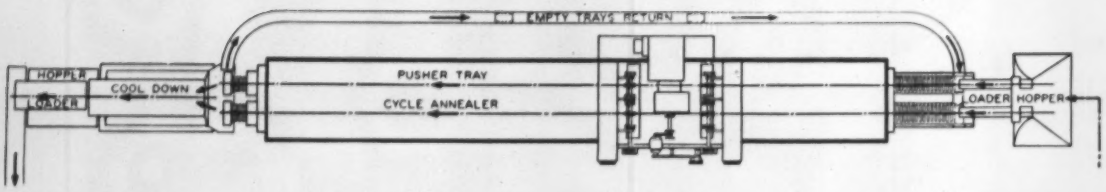
The capacity of the internal memory of Univac has also been doubled, giving instantaneous access to 24,000 numeric characters. (If needed, this can be increased to 120,000 characters.)

Univac's external memory—magnetic tape—now has greater capacity too, increasing input and output to 20,000 characters per second...the equivalent of reading or writing every character on this page more than 1,000 times a minute.

These new Univac developments can be incorporated into any existing installation to double its speed and to increase its economy still further.

ELECTRONIC COMPUTER DEPARTMENT **Remington Rand** ROOM 2173, 315 FOURTH AVE., NEW YORK 10, N. Y.
DIVISION OF SPERRY RAND CORPORATION





This 'Surface' automatic cycle annealer operates at the rate of 2,000 lbs/hr, isothermally annealing forgings of SAE 8717H, 1117, and 1137 steels.

Automatic cycle annealing repays Marion Division 4 ways

(1) Faster production, (2) product uniformity, (3) reduced machining time, and (4) reduced handling have more than repaid the Dana Corporation, Marion Division, since they installed 'Surface' automatic cycle annealing equipment.

Their cycle of heating-soaking-fast-cool-holding-fast-cool is about twice as fast as conventional annealing. At the same time, it provides exceptional control of metal structure, and results in better machinability. Furnace mechanization precisely regulates work time in each zone of the cycle, and can be varied to suit the steel.

Automatic loading and unloading provide smooth, straight-through operation and cut handling costs. Why not ask 'Surface' to help you apply these advantages to your own annealing operations?

Write for Bulletin H55-8

Surface
HEAT TREATING EQUIPMENT

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

Also makers of Janitrol automatic space heating and Kathabar humidity conditioning units

4466 Woodward Ave., Detroit 1, Mich.

Buys Columbite Property

Kennecott Copper Corp., New York, has obtained 52 per cent interest in Tin & Associated Minerals Ltd., a Nigerian company, the owner of a columbium mine and concentrating plant. It has been producing about 600,000 lb of columbite annually.

Rheem Expands on West Coast

U. S. Spring & Bumper Co., Los Angeles, changed its name to Rheem Automotive Co., a division of Rheem Mfg. Co. The company will continue to make parts for automobile assembly plants and will produce cultivator tools, highway guard rails and allied lines. F. G. Fisher is vice president and general manager of the division; D. M. Diltz, vice president-sales; O. W. Carrico, vice president-manufacturing.

Opens West Coast Office

Robertshaw-Fulton Controls Co., Greensburg, Pa., opened a western regional sales engineering office for its Fielden Instrument Division at 3101 Imperial Highway, Lynwood, Calif. C. J. O'Lone will supervise the office.

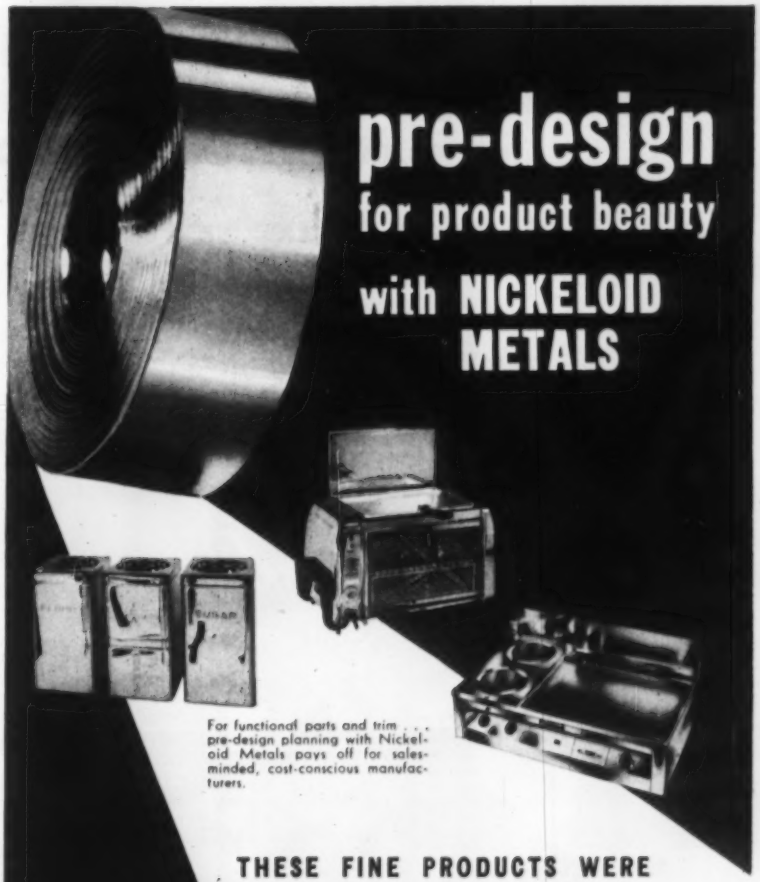
Prairie Pipe To Build Plant

A $3.5-million plant to manufacture steel pipe (from 4½ to 16 in.) will be built on the outskirts of Regina, Saskatchewan, by Prairie Pipe Co. Ltd., newly formed affiliate of Fluor Corp. Ltd., Los Angeles. The plant, scheduled to be in operation Apr. 1, 1956, will have an annual capacity of more than 100,000 tons. Cal-Metal Corp., Torrance, Calif., has been awarded a contract to furnish all machinery and equipment.

Ajax Gets Furnace Rights

Ajax Engineering Corp., Trenton, N. J., has concluded an agreement with Otto Junger GmbH., Lammersdorf, Germany, and Birlec Ltd., Birmingham, England, for the development and marketing of

(*Please turn to page* 126)



For functional parts and trim . . . pre-design planning with Nickeloid Metals pays off for sales-minded, cost-conscious manufacturers.

THESE FINE PRODUCTS WERE DESIGNED *AROUND* NICKELOID METALS

In the pre-design stage . . . before investing in tools and dies . . . consider pre-plated Nickeloid Metals. Take full advantage of their inspiring design potential and basic production savings, too. PRE-plated in uniform, quality-controlled finishes of chrome, nickel, copper or brass on base metals of steel, zinc, copper, brass and aluminum — Nickeloid Metals require no cleaning, plating, polishing. Just fabricate the parts and assemble. Eliminate 3 out of 5 basic manufacturing steps; save time, reduce costs, increase output.

MAR-NOT PROTECTION

To protect the brilliantly finished surface during drawing and forming operations, and in handling, Nickeloid Metals are available with MAR-NOT — a protective covering that affords absolute protection until final assembly, then may be peeled off. **Write for full details.**

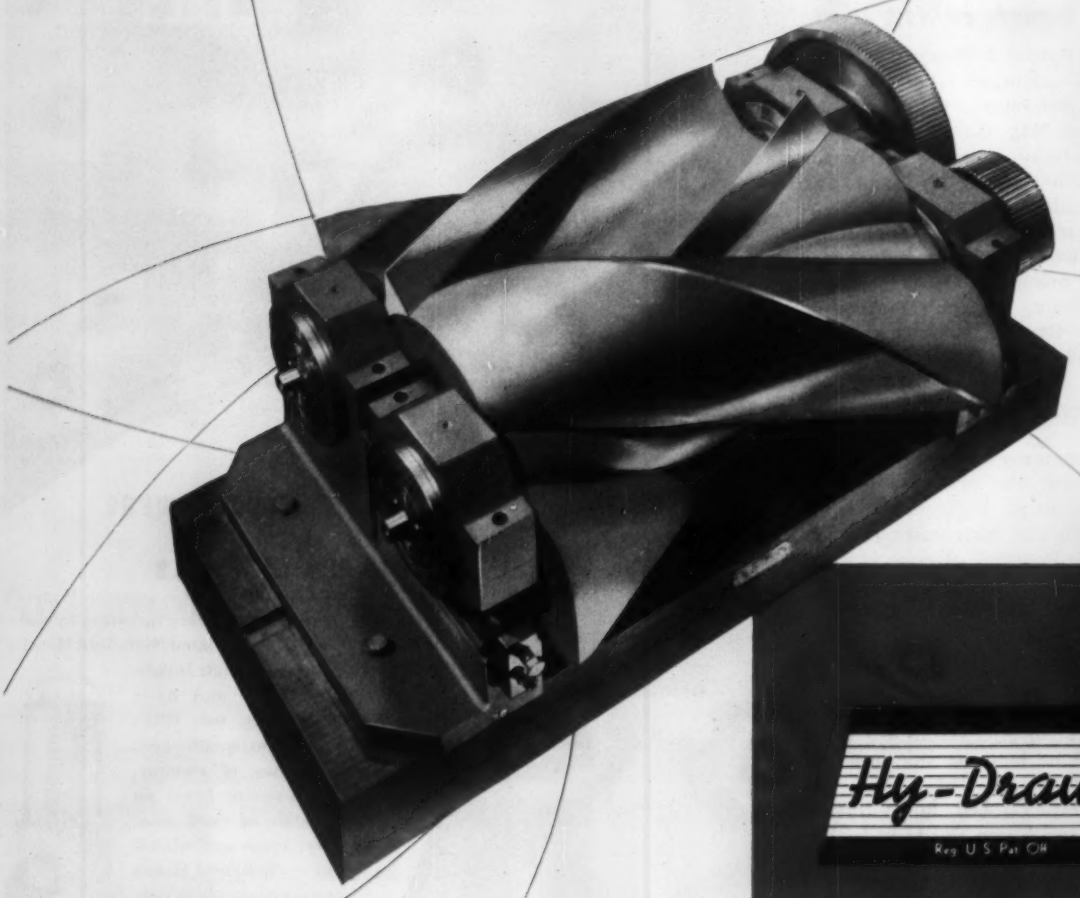
SHEETS • COILS • STRIPS

NICKELOID METALS
SINCE 1898

AMERICAN NICKELOID CO.

PERU 1, ILLINOIS

extremely difficult job???



Hy-Draulic

Reg U S Pat Off

. . . not for a **hydraulic**

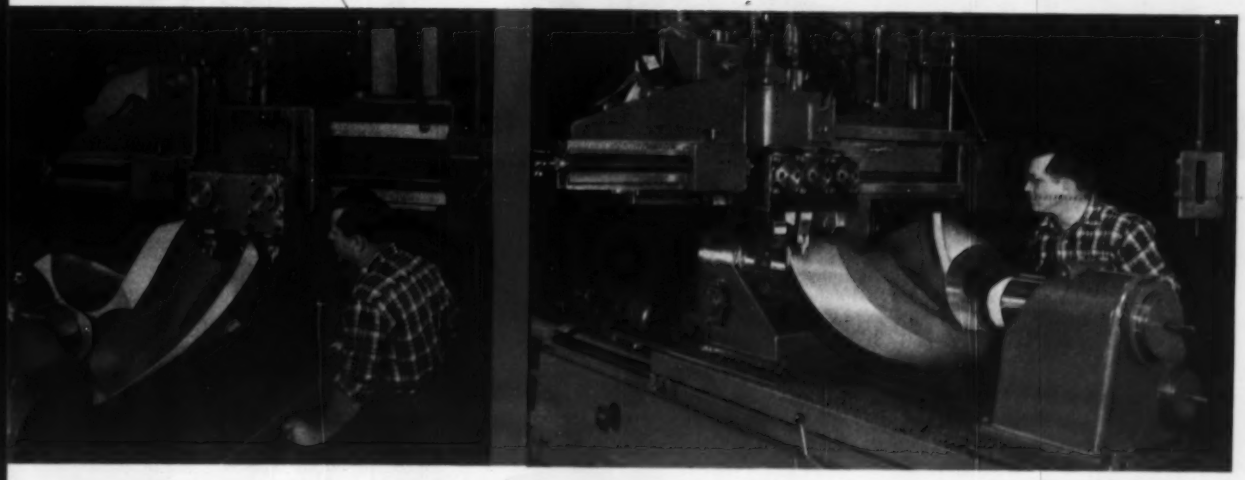
planer and duplicator

Here's another complex machining job solved by using a Hydraulic Kopy-Kat, with a rotor generating Hydraulic Shaper-Planer.

The part is a blower and consists of two sections — a two lobe rotor and a four lobe gate. The helix angle of the rotor is approximately 32 degrees.

Hydraulic Drive is a natural for extremely difficult shaping, planing, slotting and duplicating. It produces accurate work with substantial savings in production time — often several hundred percent over other methods.

Ask a Rockford Machine Tool Co. representative for the latest facts on modern Hydraulic Shapers, Planers, Slotters, Shaper-Planers and Kopy-Kats.



ROCKFORD MACHINE TOOL CO.

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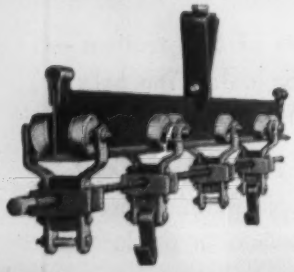
Naturals
for materials handling should be engineered . . .

just as Mother Nature "engineered" the kangaroo . . .

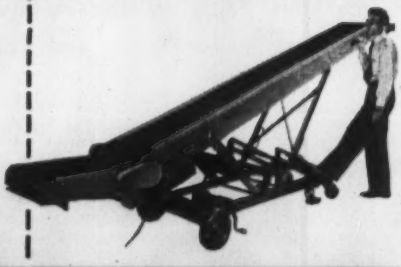
and BUSCHMAN has pre-engineered conveyors to meet your every need



OVERHEAD CABLE CONVEYORS

ROLLER CONVEYORS

PORTABLE WHEEL CONVEYORS



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In conveyors there's a "natural" for every job . . . a type that is most efficient and economical for any given application.

The fact that Buschman designs and manufactures a *complete* line is your assurance of getting the one that will do *your* job best.

Portable wheel and roller . . . live roller . . . powered belt . . . apron . . . slat . . . overhead and table cable . . . as well as special conveyors are available from Buschman. Each type has been pre-engineered for minimum initial cost and to provide long, efficient service life.

Buschman materials handling specialists will assist in surveying your plant and will recommend the most economical and efficient conveyor for each operation. No obligation, of course.

Produce more . . . handle more . . . at lower cost . . . with an efficient conveyor system that meets your exact needs . . . a system "Better Built" by Buschman.

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4496 Clifton Avenue • Cincinnati 32, Ohio
Representatives in Principal Cities
Complete Conveyor Systems For All Types of Industries • Engineered • Manufactured • Installed

(*Concluded from page* 123)

the line frequency (60 cycle) coreless induction melting furnace. Ajax officials say the furnace will be of particular interest to foundries melting high-quality cast iron — in particular nodular cast iron, chips and turnings of ferrous and nonferrous metals, including magnesium.

Empire Steel Opens Plant

Empire Steel Corp. opened its steel warehousing and fabrication plant at 4305 E. 60th Ave., Denver. Officers of the firm are Alex Englander, president, and Mike Rubala, vice president. Mr. Englander has been executive vice president and treasurer of Fabricators Steel & Mfg. Corp., New York, affiliate of Builders Structural Steel Corp., Cleveland.

Fafnir Building Plant

Fafnir Bearing Co., New Britain, Conn., is building a machining and heat-treating plant at Newington, Conn. The building will contain 160,000 sq ft of space, bringing Fafnir's manufacturing space in the New Britain-Newington area to 1.1 million sq ft. The building was designed and is being erected by Austin Co., Cleveland.

Walworth Buys Pipe Fabricator

Walworth Co., New York, acquired Southwest Fabricating & Welding Co. Inc., Houston, pipe fabricator, and will operate the property as a subsidiary. Walworth makes valves and pipe fittings.

Union Metal To Expand

Union Metal Mfg. Co., Canton, O., will spend more than $1 million on plant expansion. A new building will add 51,400 sq ft of manufacturing floor space. Additional machinery and equipment will provide a 100 per cent increase in steel tube manufacturing capacity. More space will be devoted to the manufacture of aluminum pole products, which have become increasingly important in the company's business. A new boiler plant will be built and power facilities will be expanded.

WICKWIRE ROPE DISTRIBUTORS WEAR MANY HATS

Wickwire Rope distributors are men who wear many hats. They are at home in the headgear typical of the numerous and varied industries they serve—the marine and fishing trades, the oil fields, construction, logging and many other industries having specialized wire rope needs.

These men aren't hat models—they can wear these hats because of their long experience in the industries they serve. Add to this their intimate knowledge of local conditions and their comprehensive Wickwire Rope stocks, and you'll see that your Wickwire Rope distributor is the man who can be of great help to you.

Yes, your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

CF&I WICKWIRE ROPE A CF&I PRODUCT

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

3154

Flabbergasted!

"Yes sir, that's what I was—flabbergasted! Never dreamed that we had so much of our production investment tied-up in metal cleaning and surface preparation operations. What started the whole thing off was when the Detrex man pointed out to me that in the average metal working plant ¼ to ⅓ of all the operations are metal cleaning or surface preparation. I could hardly believe it at first, but when I checked our plant—sure enough, 30% of all our operations were of that nature.

"Naturally I began to pay a little more attention to that phase of our operation and the equipment and chemicals that went into it. It seemed like a mighty good spot to try and reduce some of our manufacturing costs. So I took some time to talk to a Detrex technician and, after he had studied our operation, he came up with some down-to-earth recommendations that really made sense. I was quite surprised to learn how extensive their line of equipment is. They have all kinds and sizes of degreasers, washers and sonic cleaners. In fact, whatever you want to do in the way of metal cleaning or surface preparation, they've got the equipment to do it. And they make the chemicals, too!

"As a result of the survey of our plant and the recommendations Detrex made, we've realized some important reductions in our manufacturing costs. I feel sure that the same thing could probably be done in other plants, too. So I'll make a suggestion. Next time a Detrex man calls on you, why don't you ask him to survey your operations? He isn't going to charge you anything for that service and chances are you'll realize some savings, too. If you're like me, you probably didn't know that you could get such a survey without a cash outlay. Well you can, and the Detrex technicians are real experts in their line. When they make a survey it's factual and the recommendations are sound. You'll find, like I did, that it's time well spent."

Service with a Saving!

DETREX CORP.

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ALKALI & EMULSION CLEANERS • DRYCLEANING
EQUIPMENT • PHOSPHATE COATING PROCESSES

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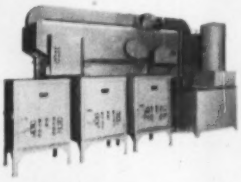
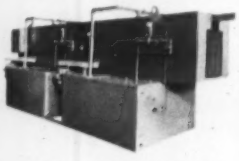
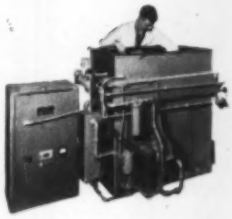


CROSSROD CONVEYORIZED SONICLEAN® DEGREASER



CONVEYORIZED MULTI-STAGE WASHER



MANUAL OPERATED SONICLEAN® DEGREASER

STEEL
November 7, 1955

Technical Outlook

WATCHDOG TV—A television camera mounted in the foundation of Alcoa's 35,000-ton forging press at its Cleveland Works keeps an eye on off-center loads that might ruin the machine. The picture: A hydraulic mechanism which indicates eccentric loading, so the press operator can take prompt action.

VACUUM DEGASSING—National Research Corp. has acquired U. S. rights to the Bochumer Verein steel degassing process. It's adaptable to degassing in the ladle, or while pouring into the ingot molds. American steel companies are intrigued by its high-volume capabilities, and the low-hydrogen, more uniform metal it produces.

METAL POWDER FACTS—Sources for information on metal powders are contained in Data Sheet No. 4, "Standards, Specifications and References for Metal Powders and Metal Powder Products," published by the Metal Powder Association, New York.

GROWING INTEREST—Each month sees more companies asking for access to restricted data related to industrial uses of atomic energy. The AEC says there were 83 in September—highest since the permit program started in April. Holders of access permits need an "L" clearance to get restricted data classified as confidential, a "Q" clearance for that classified secret.

OLD TIMER—It's easy to forget the early plastics—vulcanized fiber, for instance. It weighs half as much as aluminum, is tough and resilient, can be machined and formed on typical metalworking equipment, can be had with a tensile strength of 12,000 psi. In case you've forgotten, it's the tough stuff so familiar in football helmets, shop containers and the salesman's sample case. Typical metalworking applications: Gears, washers, electrical insulation.

NEW PROCESS—Linde Air Products says a major project at its Speedway Laboratory will involve the discovery and development of new ways to make acetylene. The gas is used in the oxyacetylene flame for heating, cutting and welding metals.

TITANIUM PROGRESS—Conical dies are better than flat dies to extrude titanium bars, says Battelle Memorial Institute. A 130 degree die angle improves metal flow and surface finish. Best temperatures are the alpha-phase region for straight titanum and alpha-beta for Ti-3Mn; best lubricants contain graphite, moly-disulphide and mica. Promising die materials are titanium carbide, chromium carbide and cobalt-base alloys.

HELP—A Naval Research Laboratory report states that the high temperature, strength and ductility of cobalt-base alloys are increased by the addition of rare earths. Both as-cast and aged material are improved at all temperatures, with greatest benefit at 1500° F.

GREAT VERSATILITY—"In recognition of his great versatility in applying science to the metal industry," Alfred L. Boegehold was named the winner of the 1955 ASM gold medal. Among many contributions cited: The development of malleable and pearlitic malleable iron for heavy sections like crankshafts. Mr. Boegehold is assistant to the vice president in charge of the General Motors research staff.

Metalworking Outlook—p. 81 *Market Outlook—p. 183*

What Quality Control Did for Aero Supply

1. Tightened manufacturing, from incoming stock to outgoing product.
2. Reorganized plant maintenance.
3. Spurred the development of new tooling and inspection instruments.
4. Altered manufacturing methods and routing procedures.
5. Sharpened methods planning.
6. Revised accounting and budgeting procedures.
7. Gave the personnel department a new basis for promotions.
8. Provided the purchasing department with a guide for evaluating suppliers.
9. Induced suppliers to adopt quality control based on the Aero pattern.
10. Inspired a continuing educational program that has boosted company morale.
11. Turned into a valuable sales promotion force.

QUALITY CONTROL:

Everybody in the Act

"WE STARTED with a better bolt, but we ended up with a better way of company life."

Strong words about a quality control program, but as you study the picture at Aero Supply Mfg. Co. Inc., you get the feeling that they ring true.

The Corry, Pa., producer of aircraft hardware began a quality control program for the most obvious of reasons: To reduce rejects. But the program refused to stay tied down. In three short years it has spread into almost every department.

Background—Even before 1952, the company had to conform to rigid quality standards set down by its prime customers, (aircraft manufacturers) and the ultimate user (in almost every case the military). To meet requirements, the company used only certified or approved processes in its heat treating, anodizing and plating steps and certified all employees working on Magnaflux or Zyglo inspections.

That wasn't enough. "What we wanted to do," says Walter Wotus, quality control supervisor, "was to implement these sporadic testings and inspections with an over-all quality control operation that would pinpoint and prevent defects, from reception of raw material all the way to final packing and shipping. To save time and money, we sought to integrate quality control right into the manufacturing process."

Stock Control — The procedure works out like this: Incoming shipments of coil stock are checked to insure absolute conformance with specifications and requirements. Physical and chemical reports accompany every supplier shipment, and, periodically, Aero double checks these through an independent laboratory.

Two samples are taken from each incoming coil and assigned to the inspection metallurgical laboratory. Here, they are rechecked for physical characteristics to make sure that tensile, hardness, shear, bend, decarburization and seam qualities meet specifications. Imperfect specimens are rejected at the beginning and returned to the manufacturer, so that they cannot bog down production schedules.

Records — Information from these checks is recorded on control forms and keyed to the control number which appears on every carton of bolts Aero ships. It provides a detailed history of every lot produced and is used as a running check to avoid rejects.

Once the laboratory-accepted bolt stock begins moving through the plant, other phases of the program come into play. In the bolt heading division, for example, four kinds of inspection maintain constant control over men, materials, machines. They are:

1. First-piece inspection: The operator gets approval by patrol inspectors for grain flow, cracks, dimensional characteristics before production can begin.

2. Process inspection: To determine whether anything is amiss, the operator makes a dimensional inspection every 15 minutes.

3. Patrol inspection: Quality control inspectors make a check once or twice an hour.

Control Chart—Results of the three inspections are recorded by the operator and inspector on a process control chart attached to every machine. It lists 80 major reasons for quality failure, including oversize, off center, defective material, broken tool, burning and exposed winding.

4. Gateway Inspection. A final sampling of about 20 per cent of all bolts by full-time inspectors using Dodge and Roming double sampling tables takes place before material can leave one department for another.

Other Checks—This kind of control within a single department goes on through trimming, drilling, threading, heat treating, electroplating and Magnaflux operations. There also are special inspections and tests along the way. During electroplating, for example, every barrel or tank is checked by drop testing for plating thickness, and threads for form and pitch diameter, using ring and roll thread gages.

When specifications require 100 per cent Magnaflux inspection, bolt heads are dyed for identification. When there are more than an average number of defects, the company Magnafluxes each bolt.

Final inspection checks are made for dimensional accuracy, plating thickness and finish. In addition, control numbers and Rockwell cards are co-ordinated to make sure nothing has gone astray during manufacture.

Branchout — So much for the quality control program itself. Equally important are the directions in which it has traveled. "We knew from the beginning," says the quality control foreman, "that this would work only if supervisors, foremen and the operators understood and approved their roles."

As of 1952, this was hardly the case. Foremen considered quality control an extra and unnecessary duty to be squeezed into already overcrowded schedules. Some operators found it complicated, confusing and impractical. Others thought it was a gestapo scheme to weed out inefficient workers.

Education — To disprove these charges, quality control launched a full-scale training program featuring courses, slide films, discussions, practice sessions and a pin ball machine that visually brought home to employees the twin concepts of probability and frequency distribution.

Every educational weapon was designed to prove four facts about quality control:

1. It creates a better product at a reduced cost.

2. It reduces inspection and maintenance costs.

3. It helps meet competition.

4. It aids the operator by showing him how to get more efficiency out of his machine, more money and responsibility out of his job.

"Once we proved that quality control helps, not hurts the worker," Mr. Wotus sums up, "half the battle was won."

Maintenance—But quality control still had a number of other objectives. Machines had to be repaired and maintained as well as inspected. Maintenance men were brought into the quality control act with discussions and visual aids.

Today, new maintenance employees are briefed on the importance of quality control. They are shown how operation of any machine they service affects over-all rejection rates. Like the machine operator and plant foreman, they attend regular training and refresher courses to improve their daily equipment inspections and repair techniques.

Instruments—From better machine maintenance to better inspection instruments was only one short step. This brought into the quality control picture a whole new covey of specialists, including instrument designers, machine designers, process and industrial engineers and a number of shop inspectors.

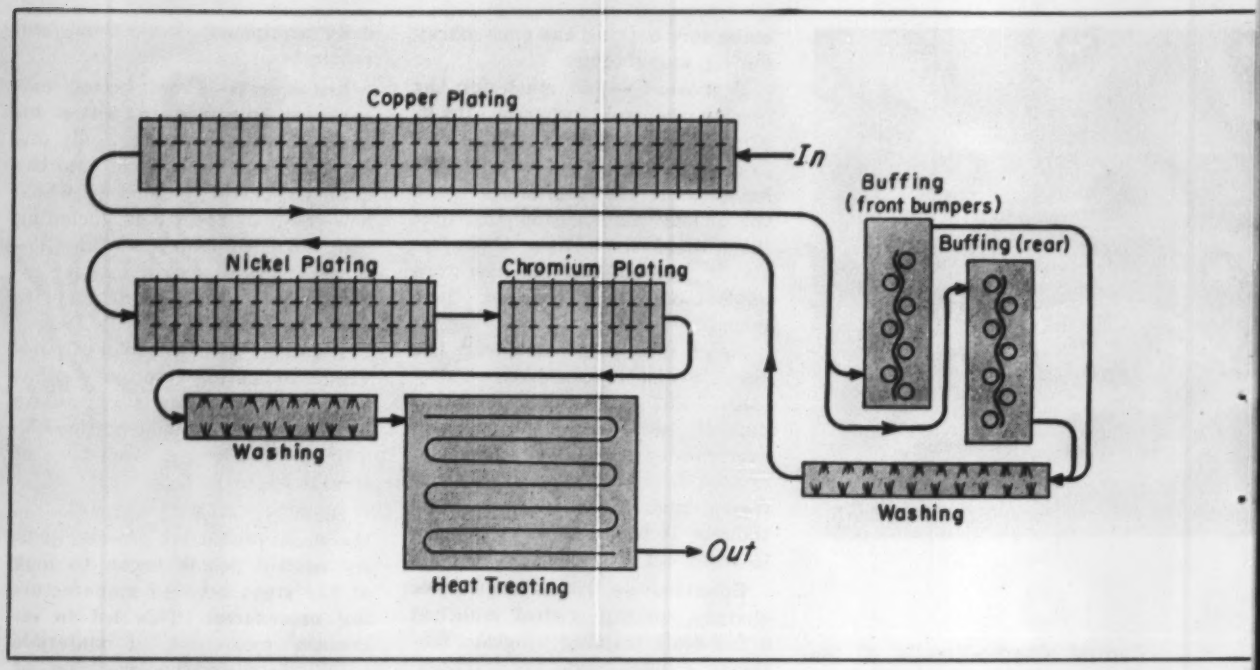
Together, they developed universal indicating-type gages that have saved thousands of dollars by eliminating product bottlenecks owing to the long delivery time of special gages.

Handling — With emphasis on the whole productive process, quality control people began to look at the steps between manufacturing procedures. This led to increased awareness of materials handling, since the precision of the company's products makes them especially susceptible to mutilation during movement.

Aero uses stacking containers for moves from one department to another. They allow full use of vertical storage space and protect partly finished or completed lots from damage.

Into Everything — Quality control procedures and attitudes have found a place in other departments. In methods, for instance, where new steps and routing procedures are planned, manufacturing processes were altered to meet quality requirements. In accounting, exhaustive defect prevention budgets were prepared and analyzed. In personnel, exceptional quality control records have been rewarded by rapid promotions. The effects are felt in purchasing and sales.

Quality control summaries are an excellent record of the performance of suppliers. Not only can the best vendors be selected by the purchasing agent, but the company can work with vendors on improving their methods and products. A number of suppliers have incorporated quality control steps of their own, built upon the Aero Supply model. Even the sales promotion department has used it to cement old client relationships and open up new sales avenues.



Oldsmobile bumper plating line

Three Ways To Plate a Bumper

Pontiac: Copper strike, copper plate, nickel strike, nickel plate, chromium plate with no intermediate polishing. (STEEL, Dec. 20, 1954, p. 78)

Chevrolet: Nickel strike, copper plate, nickel plate, buff, chromium plate. (STEEL, Oct. 3, 1955, p. 76)

Oldsmobile: Copper strike, copper plate, buff, copper flash, bright nickel plate, chromium plate, stress relieve (see below).

DIVERSITY is the rule for bumper plating in the GM family. Pontiac, Chevrolet and Oldsmobile go about it in different ways (see box).

Oldsmobile has added an unusual step: Heat treatment for stress relief. It is the last lap of a tremendous new plating line in the Saginaw street plant in Lansing, Mich.

To go back to the beginning, you have to look at bumper design.

Cell Type — Until the wrap-around style became popular, bumpers could be plated successfully while moving through a long tank. The wrap-around made conforming anodes necessary to get an even distribution of plate. In the long tanks, that didn't work out well.

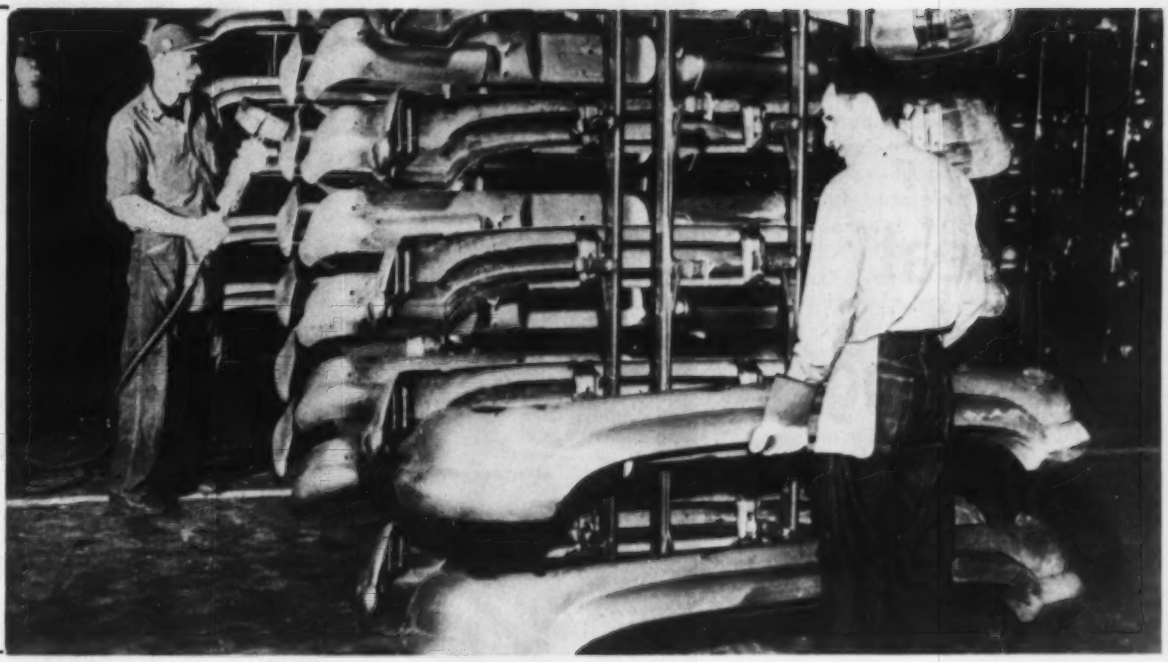
The answer was selective cell-type plating. The bumpers could be racked horizontally. The anodes could be arranged on the sides of the tank where they wouldn't have to be bagged and wouldn't be affected by material settling to the bottom of the tank.

But a tremendous problem was posed. In the last two years, Oldsmobile's bumper requirements have jumped 90 per cent. How could slow-motion, cell-type plating and doubled production be made compatible?

Solution — Automation to the eyeballs was the answer. Hanson-VanWinkle-Munning Co., Matawan, N. J., came up with a plating system automatic from start to finish. It ties in with a mile-long conveyor system built by Jervis B. Webb Co., Detroit, to operate between the plating steps.

The handling system had to be unusually rugged. Each loaded plating rack weighs close to 1000 lb and holds 10 front or 14 rear bumpers. One rack moves through the system every 163 seconds.

Selective — Few cell-type systems have been designed which



Touchup and loading racks. From this point it's no-hands operation

will handle this sort of volume. Racks to be plated have to be deposited in an empty cell, by-passing others. Then each rack has to be picked up after a predetermined time, again by-passing. Such a system is complicated by the differing times racks remain in the plating cells (in this case, 1 hour in copper, 24½-minutes in nickel, 2½-minutes in chromium).

To get the production it wanted, Oldsmobile set up three plating machines. One has 24 copper plating cells; one has 10 nickel; the other, 3 chromium. Each machine has precleaning, plating and rinsing sections.

Load and Lift—Each section has its own elevator mechanism. Racks over the pretreatment and rinsing sections are raised and advanced simultaneously. Over the plating cells, they are individually and selectively handled.

Mechanical handling devices transfer the racks between conveyors and the plating machines. Even the buffing cycle between copper and nickel plating is completely automatic. There's no manual handling from the time the racks enter the copper line until they emerge from heat treating furnace.

Heat and Power—Heat treatment is primarily to prevent hydrogen embrittlement in the chromium layer. Bumpers are in the 550 °F oven for 30 minutes.

Each electrified cell in the line is supplied by an individual motor generator set. It takes well over 30 sets to supply the copper plating section of the line alone.

All controls for the conveyor system are housed in a room where a graphic panel shows traffic conditions. With the full picture in front of him, the operator can prevent jamups and keep all parts of the line busy.

How Oldsmobile Plates a Bumper

Polish	Cathodic clean
Inspect	Cold rinse
Load racks	Cold rinse
	Cathodic cyanide dip
Alkali wash	Cyanide copper flash
Cathodic clean	Cold rinse
Cold rinse	Bright nickel plate (24 minutes)
Hot rinse	Reclaim rinse
Acid etch	Cold rinse
Cold rinse	Hot rinse
Cold rinse	
Anodic clean	Cathodic clean
Cold rinse	Cold rinse
Acid dip	Cathodic acid dip
Cold rinse	Cold rinse
Cathodic cyanide dip	Warm rinse
Cyanide copper strike	Chromium plate (2½-minutes)
Reclaim rinse	Reclaim rinse
Copper plate (1 hour)	Reclaim rinse
Reclaim rinse	Cold rinse
Hot rinse	Hot rinse
Automatic buff	Stress relieve
Wash	

Heat Treating Gray Iron

PART III

PEOPLE WHO USE castings have a bag of tricks to get the most in hardness and strength out of gray iron. In addition to the methods of surface hardening described last week (STEEL, Oct. 31, p. 76), there are through hardening and hot quenching techniques.

Through Hardening—It is possible to harden a casting throughout by oil or water quenching, if it is not too great in section. In castings of heavy cross section, only the outer layer may cool fast enough to produce a martensitic structure; the core cools to a pearlitic or similar structure.

Rate of cooling rather than temperature becomes the controlling factor in obtaining the right martensitic structure by quench hardening.

Range—Through hardening can be applied to a wider variety of gray irons than either flame or induction hardening. Even an iron containing no combined carbon may be hardened. In fact, castings may be rendered carbide free or ferritic by annealing for maximum machinability and then quenching to a martensitic structure to promote maximum wear resistance.

Although gray iron of almost any composition can be through hardened, low-silicon gray iron (under a maximum of 2 per cent) is best.

Austenizing—The first step is to heat the casting to 1550-1650°F, to form austenite, and to hold it at that temperature until the maximum amount of carbon has been dissolved. This may be done in a salt bath or other furnace.

The higher the casting is heated above the transformation range, the greater will be the amount of carbon absorbed in the austenite and the higher will be the hardness after quenching. In practice, temperatures from 50 to 100° F higher than the calculated transformation range are used to assure full austenization. Avoid excessively high temperatures; they increase the danger of distortion and cracking.

Speed—Heating should be slow through the lower temperature ranges. Above 1100 to 1200° F it may be as rapid as desired.

A good way to save time is to heat the casting slowly to about 1200° F in one furnace and then transfer it to a second furnace to bring it up to the hardening temperature rapidly. It should be held there long enough for it to be heated uniformly throughout. As little as 20 minutes per inch of section may prove sufficient.

Quenching—Choose a quenching medium which provides the critical cooling rate to the desired depth but does not extract heat too rapidly from the casting. Water is generally not satisfactory.

The usual medium is oil of high flame point. The least drastic is air. Unalloyed or low-alloy castings cannot usually be air-quenched, because the cooling rate is not sufficiently high to promote the formation of martensite. With irons of high alloy content, air quenching is frequently the most desirable method.

Castings of nonuniform section should be quenched so that the heavier section enters the bath first. Stirring the bath improves quenching efficiency. The casting should be removed as soon as it reaches temperatures between 300

and 500°F and immediately tempered.

Tempering—Tempering temperatures vary from 300 to 1020°F, depending on the composition of the gray iron and the final properties desired. Choose a tempering temperature higher than the service temperature. The casting should be held at the tempering temperature for about 1 hour per inch of thickest section.

Maximum hardness is obtained by tempering between 300 and 400° F for an unalloyed, low-silicon gray iron.

Improvement—Gray irons that have been quenched and tempered usually show wear resistance about five times as great as that of pearlitic gray irons. With temperatures of over 700°F, the wear resistance of unalloyed irons decreases more sharply than that of alloyed irons. Gray irons with low carbon equivalent, after quenching and tempering, show more wear resistance than irons containing higher percentages of carbon and silicon.

Tempering also improves tensile strength. For unalloyed gray iron, maximum strength is obtained by tempering in the range of 570 to 700°F; for alloyed irons temperatures of 750 to 930°F are necessary. A through hardened and tempered gray iron also tends to have improved usable strength and dimensional stability.

Alloy Effects—Tempering temperatures in the neighborhood of 700°F increase the impact resistance of hardened, low-silicon, unalloyed gray iron. If alloying elements are present in any quantity, higher temperatures may be necessary.

High tempering temperatures, such as 1020°F, improve the machinability of quenched gray iron, but with comparable loss in wear resistance and hardness. It is better to machine castings in the as-cast condition before heat treating, if practical.

More Effects—Carbon and silicon in amounts over those necessary to keep the iron gray tend to decrease the apparent hardness but not the microhardness. Manganese in excessive amounts tends to decrease tensile strength of quenched gray iron (but less than the decrease in strength in as-cast gray irons of similar composition). Tempering of manganese irons reduces hardness but increases tensile strength.

Chromium increases the hardness of quench-hardened gray irons, especially if the higher tempering temperatures are employed. Molybdenum as an alloying element can also produce quench-hardened gray irons of high tensile strength and hardness. In one commercial molybdenum gray iron, minimum hardness of 550 Brinell is regular.

Applications — Applications of quench-hardened gray iron have been numerous, particularly where high wear resistance and strength, combined with machinability and castability, are required. Typical are: Cams and cam rollers, cylinder liners, dies and punches, electric motor frames, gages, gears, machine tool parts, pump bodies and parts, rim and ram tips, rolls, textile machine parts, valve guides and seats, worms and shafts.

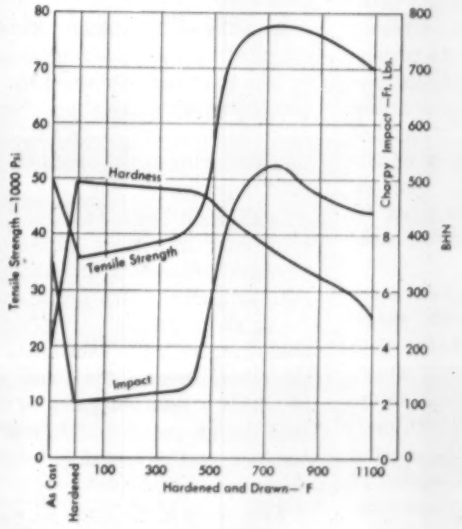
Hot Quenching—Isothermal heat treatment, or hot quenching, is a process of quenching from a temperature above the critical range into a bath of salt, oil or molten lead held well above room temperature.

Hardness, wear resistance and toughness of the gray iron may be improved considerably over the as-cast condition. This method is particularly suited to gray iron. It minimizes the drastic stresses set up by conventional quenching.

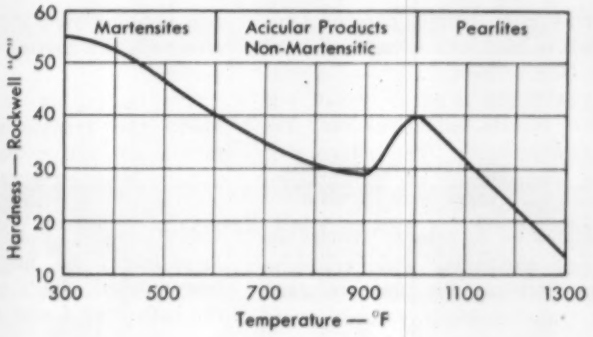
Hot quenching can be subdivided into two different operations, austempering and martempering.

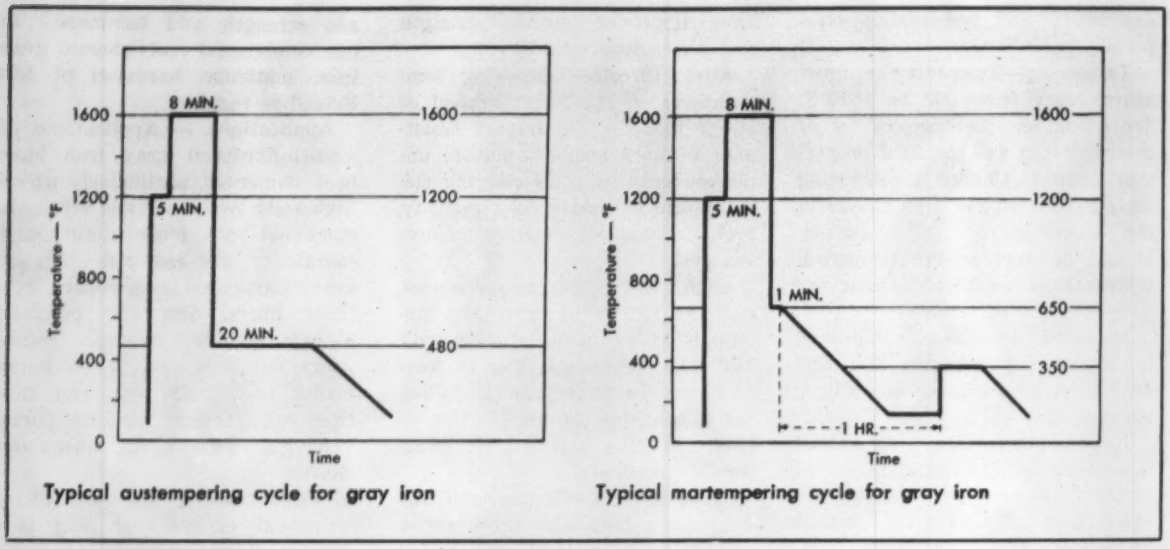
Austempering — In austempering, the microstructure of the gray iron matrix is essentially

Effect of heat treatment on a low-silicon gray iron



Effect of structure on hardness of a hot quenched gray iron





Typical austempering cycle for gray iron

Typical martempering cycle for gray iron

bainite. The iron is quenched from a temperature above the transformation range into a salt, lead or oil bath and held there at constant temperature until transformation to bainite is complete.

In all hot quenching, temperatures to which the casting must be heated, and holding times at that temperature prior to quenching, correspond to the temperatures and times used in hardening. (Between 1400 and 1650° F, held for 20 minutes per inch of thickness after reaching temperature.)

Temperature — The salt bath should be held between 450 to 800°F, depending on the alloy content and the desired mechanical properties. When high hardness and wear resistance are the ultimate aims, quench temperatures are usually held within the lower portion of the range, between 450 to 550°F.

The factors that determine the holding time for maximum transformation to bainite are the temperature and the composition of the iron. The influence of austenite grain size is usually small, but under certain conditions may become significant. The influence of iron composition on the holding time may be considerable.

Alloys — Additions, such as nickel, chromium and molybdenum, increase the time required for transformation. Good procedure to determine the holding time in a practical case would be: 1. Determine approximate quench bath temperature on the basis of the desired final hardness. 2. Test some specimens at different holding times and select the minimum time required for obtaining the desired properties.

Section size influences holding time in the quench bath: Large sections must be held for longer periods than small ones. Thickness of the section and the shape of the piece may limit the use of austempering, as speed of cooling must be fast enough to avoid any transformation until the casting reaches the temperature of the bath.

Martempering — Martempering is used to produce martensite without developing the high stresses that usually accompany its formation. It is similar to conventional quench hardening, but distortion is virtually eliminated. Nevertheless, a considerable portion of the innate brittleness of the martensite remains, and if this must be removed, the casting can be tempered.

The casting is quenched from above the transformation range into a salt, oil or lead bath; held at a temperature slightly above the martensite formation range (about 400-500°F for most unalloyed irons) only until the casting has reached the temperature of the bath; and cooled to room temperature.

Results—If a wholly martensitic structure is desired, the casting should be held only long enough in the hot quench bath to let it adjust to nearly uniform temperature through the section. Thus, the size and shape of the casting control results.

In most cases, isothermal heat treatment gives castings higher toughness than those quenched in oil or water and tempered to equal hardness. Wear resistance of hot-quenched castings also compares favorably with those quenched and tempered. In most irons, the hardness obtained by isothermal transformation is somewhat less than that obtained by quenching and tempering at the same temperature.

Benefits — Maximum hardness obtained by austempering is usually less than that obtained by martempering, although this difference may be mostly canceled during the tempering often specified after martempering.

Isothermal heat treatment of gray cast iron may improve the physical properties of such products as piston rings, brake drums, brake shoes and crankshafts. Hot quenching of gray iron holds considerable promise for those cases in which structural parts of intricate design require high wear resistance and strength.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Office with concealed piping, only the heads showing

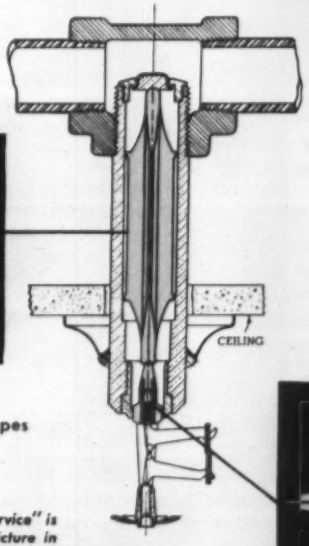
REVERE Extruded Shapes

in dry pendent sprinkler heads lessen machining, save money

Some 16 years ago the Viking Corporation, Hastings, Michigan, decided to find a way to put sprinkler piping for dry pipe systems above the finished ceiling, leaving only the sprinkler heads visible. This meant designing a sprinkler head which would be free of water except when in use. Thus there would be no drainage problem, and no chance of freezing. The dry pendent sprinkler head as finally developed extends into the sprinkler pipe, where a bronze cap keeps the entire valve waterless. When a fire occurs the usual fusible element melts, two struts drop, releasing the cap and permitting water to flow.

In the original experimental work, the two struts were machined out of solid brass bar. This took time and involved the generation of a considerable amount of scrap, since each strut has four deep fins. Once the idea had proved itself, Viking came to Revere for extruded shapes, in order to save both machining and metal. So much time has elapsed since the original machining of the bar that comparative cost figures would be meaningless, but it is evident to Viking, and to everybody familiar with extruded shapes, that the saving is substantial.

Cross section of Viking Dry Pendent Sprinkler Head, and cutaway view



Outline of the two shapes supplied by Revere

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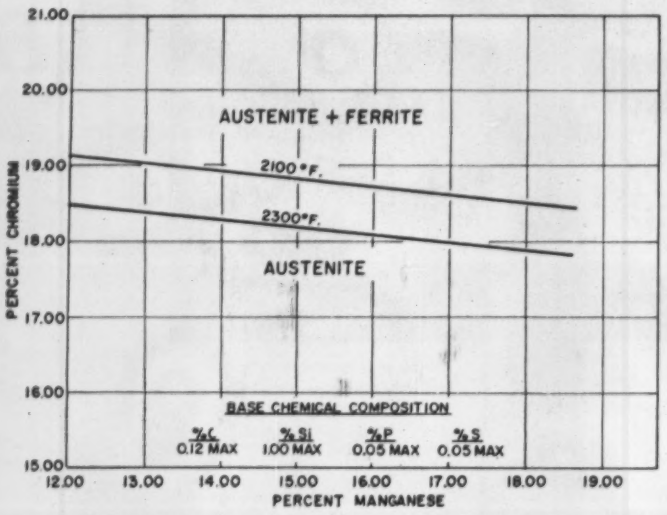


Fig. 1. Structure diagram for 0.00 per cent nickel, 0.40 per cent nitrogen steel after heating for 1 hour at temperature and water quenching

New austenitic stainless can be made without nickel. Details of the process and application were revealed at Cleveland meeting of American Iron & Steel Institute

By Dr. D. J. CARNEY
Superintendent, No. 2 Electric Furnace Dept.
South Works, U. S. Steel Corp.
Chicago

High-Nitrogen Steels: New Stainless Family

ALTHOUGH it contains little or no nickel, a new chromium-manganese steel is completely austenitic at temperatures to 2300° F. The key to its stability at high temperatures is a nitrogen content more than double previous limits.

The Cr-Mn-N steel is a new stainless steel with special applications, not merely a substitute for presently used grades during periods of nickel shortage.

Objective — High-nitrogen steel is the result of a U. S. Steel study aimed at conserving nickel. The objective was to produce a nickel-free, austenitic steel with mechanical properties similar to those of AISI type 301 at a minimum chromium content of 17 per cent.

Because of past rolling difficulties with other substitute alloys which contained delta ferrite at rolling temperatures, it was necessary that the new alloy be free of ferrite at temperatures as high as 2300° F.

Effect of Nitrogen — We knew that nitrogen was a powerful austenite stabilizer, but its use in stainless steel has been limited to 0.25 per cent or less. Greater nitrogen content was supposed to result in bleeding ingots.

We found that by adjusting the chemical composition, particularly the combined chromium and manganese contents, we could produce sound ingots with nitrogen contents as high as 0.65 per cent.

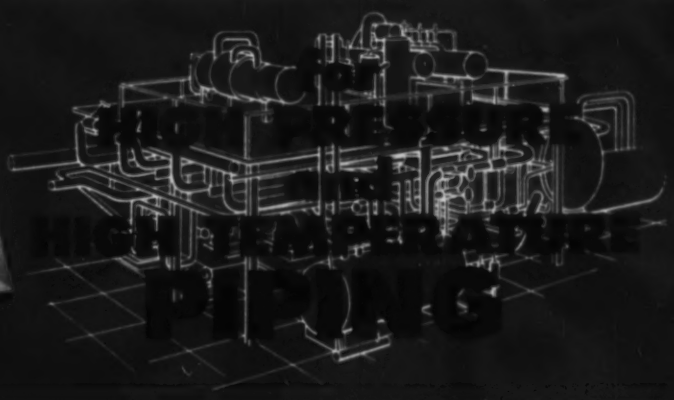
First Phase — This opened the door to an unexplored area for reducing nickel content. The first step was to vary the chromium, manganese and nitrogen contents of the steel at low carbon and nickel levels to establish the de-

Corrosion Resistance to Nitric Acid*

Grade	Penetration In. per month
17-7	0.0010
Cr-Mn-N	0.0034
17 per cent Cr	0.0040
16-1-17	0.0050

*Boiling 65 per cent nitric acid. All steels were annealed for 30 minutes at 1950° F

STEEL FORGINGS by MESTA



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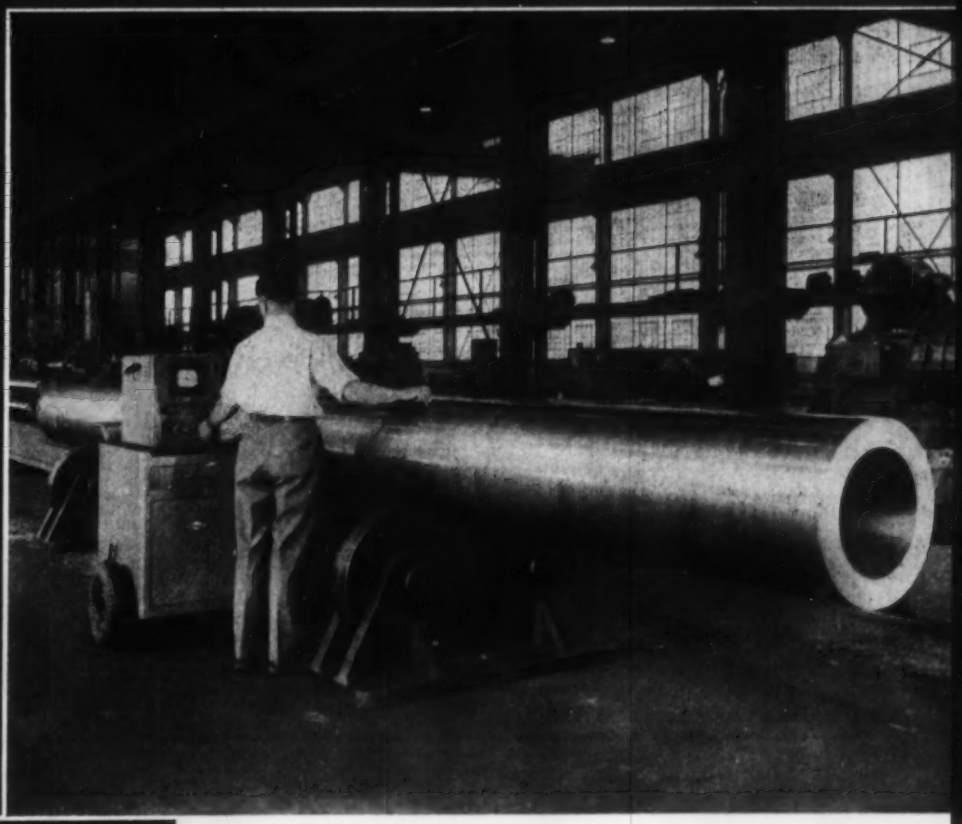

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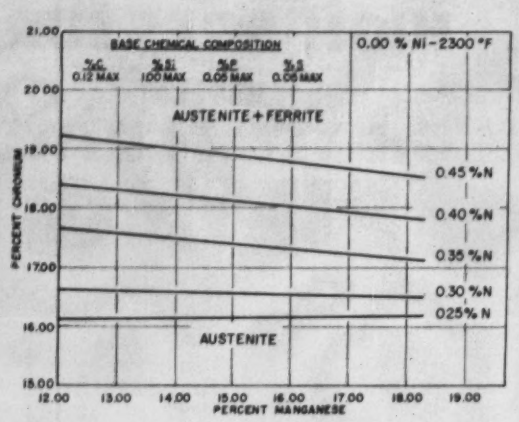

Fig. 2. Structure diagram for 0.00 per cent nickel, 0.25-0.45 per cent nitrogen steels after heating for 1 hour at 2300°F and water quenching

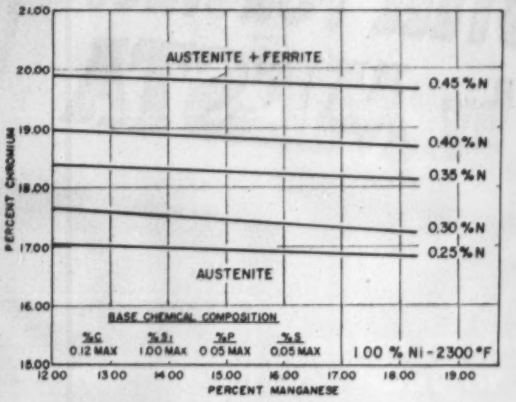

Fig. 3. Structure diagram for 1.00 per cent nickel, 0.25-0.45 per cent nitrogen steels after heating for 1 hour at 2300°F and water quenching

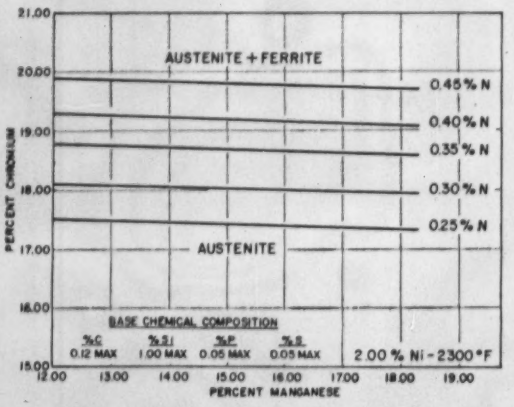

Fig. 4. Structure diagram for 2.00 per cent nickel, 0.25-0.45 per cent nitrogen steels after heating for 1 hour at 2300°F and water quenching

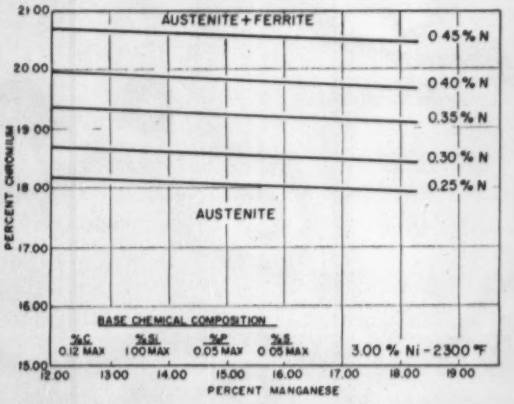

Fig. 5. Structure diagram for 3.00 per cent nickel, 0.25-0.45 per cent nitrogen steels after heating for 1 hour at 2300°F and water quenching

gree of the austenite stability at common rolling temperatures.

This was done at 0, 1, 2 and 3 per cent nickel levels. We concentrated on the zero nickel level to determine if it were feasible to produce a completely austenitic stainless steel with 17 per cent chromium by varying the manganese and nitrogen contents. For good corrosion resistance, the carbon content was established at 0.12 per cent maximum.

Results—Fig. 1 illustrates some of the important findings. The base chemical composition used in this study is listed on the chart. The chromium content varied from 15 to 21 per cent and the manganese from 12 to 19 per cent.

The figure reveals that it is possible to produce a structure, which is completely austenitic at temperatures as high as 2300° F, with a chromium level of 17 per cent and a residual nickel content, by use of 0.40 per cent nitrogen and 15 per cent manganese.

The austenite field decreases and ferrite forms as the temperature is raised. For all steels studied, we found that increased manganese contents above a certain minimum level tended to promote ferrite rather than austenite at high temperatures.

Nickel Level—Figs. 2, 3, 4 and 5 show the austenite phase boundary at 0, 1, 2 and 3 per cent nickel levels, with nitrogen contents varying from 0.25 to 0.45 per cent. These figures show the powerful influence of nitrogen and the relative influence of nickel on austenite stability at 2300° F. For example, at the 3 per cent nickel level, the chromium content could be raised to over 20 per cent by using 0.45 per cent nitrogen and still retain a completely austenitic structure at 2300° F.

At each nickel level there was a minimum manganese level for a given chromium and nitrogen content. Below this point, nitrogen evolution occurred during solidification. Example: At the 0 per cent

10 cold-finished
JALCASE
grades
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MEMORANDUM
Here's another new book
by J+L...you'll want it for
your reference material
NOTE:
Data on J&L's Jalcase include information on the superior machinability of this cold finished steel. Both speed of machining and the amount of metal removed per revolution can be substantially higher than with other steels of approximately the same mechanical properties.
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3 tests show butyl rubber-

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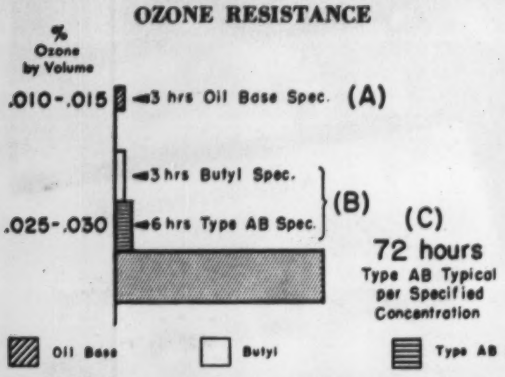
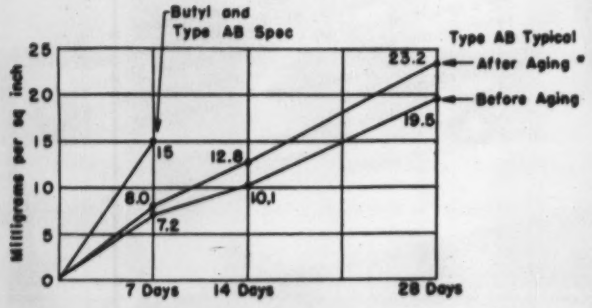


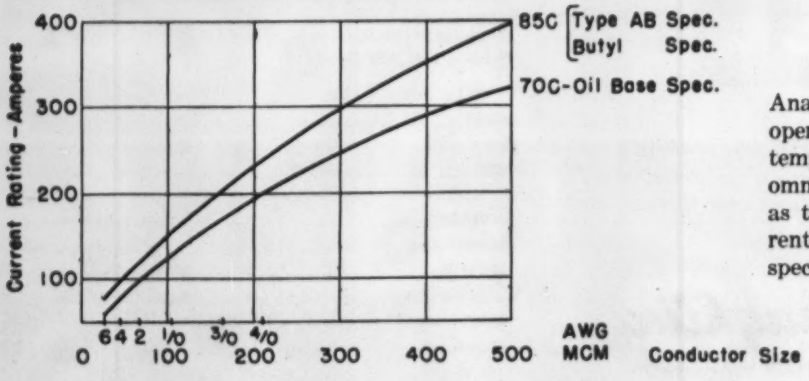
In standard ozone-chamber test, Type AB insulation showed no injury after 72 hours in 0.025-0.030% ozone concentration . . . 24 times longer than required by oil base and butyl specifications.

MOISTURE ABSORPTION



For the mechanical moisture absorption test, the industry has regarded 15 milligrams increase in weight per square inch of exposed surface, after 7 days' immersion at 70C, as a criterion for satisfactory moisture resistance. Type AB easily meets that requirement—in fact, after 28 days of immersion it is only a fraction above the 7-day requirement.

OPERATING TEMPERATURE



Anaconda recommends Type AB for operation at 85C maximum operating temperature. Industry standards recommend 70C for oil base. That means, as the graph shows, Type AB's current-carrying capacity exceeds oil base specifications by 22%.

insulated Durasheath* Cable has

ozone, heat and moisture

Anaconda exclusive Type AB butyl rubber insulation resists ozone far longer than needed to prove its high ozone resistance . . . absorbs far less moisture . . . has 22% more current-carrying capacity.

Standards are set up for your protection—but most standards state minimum requirements.

Anaconda's Type AB butyl-insulated cable performance exceeds its own specification requirements and goes far beyond industry requirements—gives you an extra margin of protection against the major enemies of long cable life.

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The pay-off is in your operations—in longer cable life . . . in less maintenance . . . in lower over-all operating costs. The Man from Anaconda will be glad to give you full details about Type AB-insulated Durasheath and other Type AB-insulated high-voltage cable. Why not call him today? Or for more information, write Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Reg. U. S. Pat. Off.

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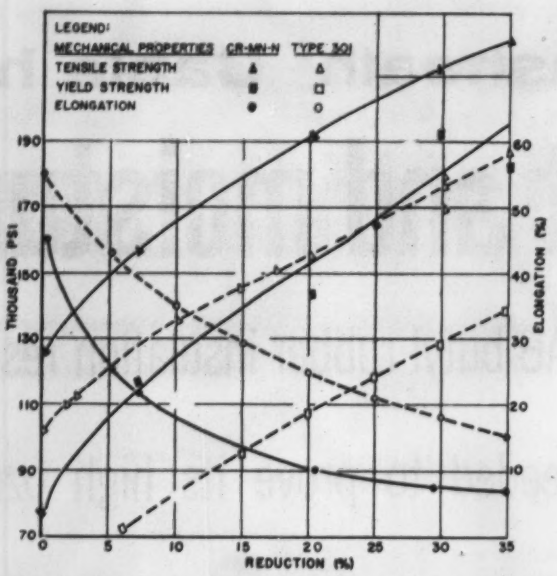

Fig. 6. Effect of cold reduction on the mechanical properties of sheet product of a commercial 7-ton heat of 0.00 per cent nickel, Cr-Mn-N steel compared with a typical AISI type 301 stainless steel

nickel, 15 per cent chromium, 0.45 per cent nitrogen level, bleeding began to occur at 14.5 to 15.0 per cent manganese.

The increase in ferrite generally was gradual as the composition passed below the austenite phase boundary lines shown in the figures. Thus, in some cases, the rollability may be satisfactory with a chemical composition somewhat below the phase boundary lines shown in the accompanying charts.

Microstructure—Tests were made on 26-lb induction furnace heats cast into ingots 3½-in. in diameter and 18-in. tall. Sections were sliced from the top to investigate gas porosity and to determine the microstructure of cast ingots. The balance of each ingot was heated and hammer forged to rounds about 1 in. in diameter, or to ¼ x 3-in. flats.

Samples were cut from the forged sections to determine the microstructure, primarily the amount of ferrite, in the as-forged and in the heat-treated conditions.

Test Temperatures—The samples were heated in a laboratory furnace to temperatures within the 1900-2400° F range for 1 to 2 hours and water quenched. After quenching, samples were sectioned and polished metallographically.

The amount of ferrite was determined for each sample either magnetically or microscopically. The correlation between the microscopic and magnetic ratings for ferrite was good (±0.5 per cent at a 5 per cent ferrite level).

Most of the steels nitrided rapidly when heated in air above 2000° F. Nitrided areas were eliminated in rating samples for ferrite. About 300 laboratory heats with varying chemical compositions were produced and tested.

Use-Properties of Cr-Mn-N Steels

HIGH-NITROGEN STEELS combine high yield strength with high ductility.

Yield-tensile ratio, although much higher than type 301, increases with increasing cold reduction at a rate similar to 301 (Fig. 6). Annealed Cr-Mn-N steel has a yield strength double that of the 17-7 type steels with the same elongation value.

Cold Working—A 10 per cent cold reduction of the Cr-Mn-N steels gives physical properties equal to that of type 301 after a 25 per cent cold reduction. The resultant ductility is markedly higher in the new steels. Bending and cold forming properties are good.

These properties can be produced over a wide range of manganese and nickel contents as long as the nitrogen is maintained at a relatively high level.

Test—One 7-ton, basic arc furnace heat, which contained no added nickel, was poured into a 75 x 35 x 20-in. ingot and rolled into 4 x 30-in. slabs.

The degree of chemical segregation observed in the as-rolled was not excessive or harmful for most applications. The macroetch quality of the slabs was satisfactory and microscopic examination revealed a completely austenitic structure in the as-rolled condition.

The slabs were rolled on a continuous 80-in. hot strip mill into 0.125-in. thick strip. This strip (in the form of coils) was annealed, pickled and cold reduced to develop mechanical property data.

Other Properties—Corrosion and high-temperature properties appear to be satisfactory.

Small sheet samples of the steels were welded and tested for corrosion resistance in dilute sulphuric acid after severe bending. As long as the carbon content was below 0.12 per cent, no evidence of intergranular corrosion was found in the heat-affected weld zones.

Nitric Acid Test—In a concentrated nitric acid atmosphere, the new steels are not as satisfactory as the high-nickel steels (see table on page 138). They are better than 16-1-17 (15.5 per cent Cr, 16 per cent Mn, 1 per cent Ni and 0.15 per cent N) and the 17 per cent Cr steels.

Welding tests demonstrate that the new steels may be welded as satisfactorily as 18-8 although welding conditions may have to be modified. High temperature strength at 1200°F may be as good or better than AISI type 347 for high-temperature service.

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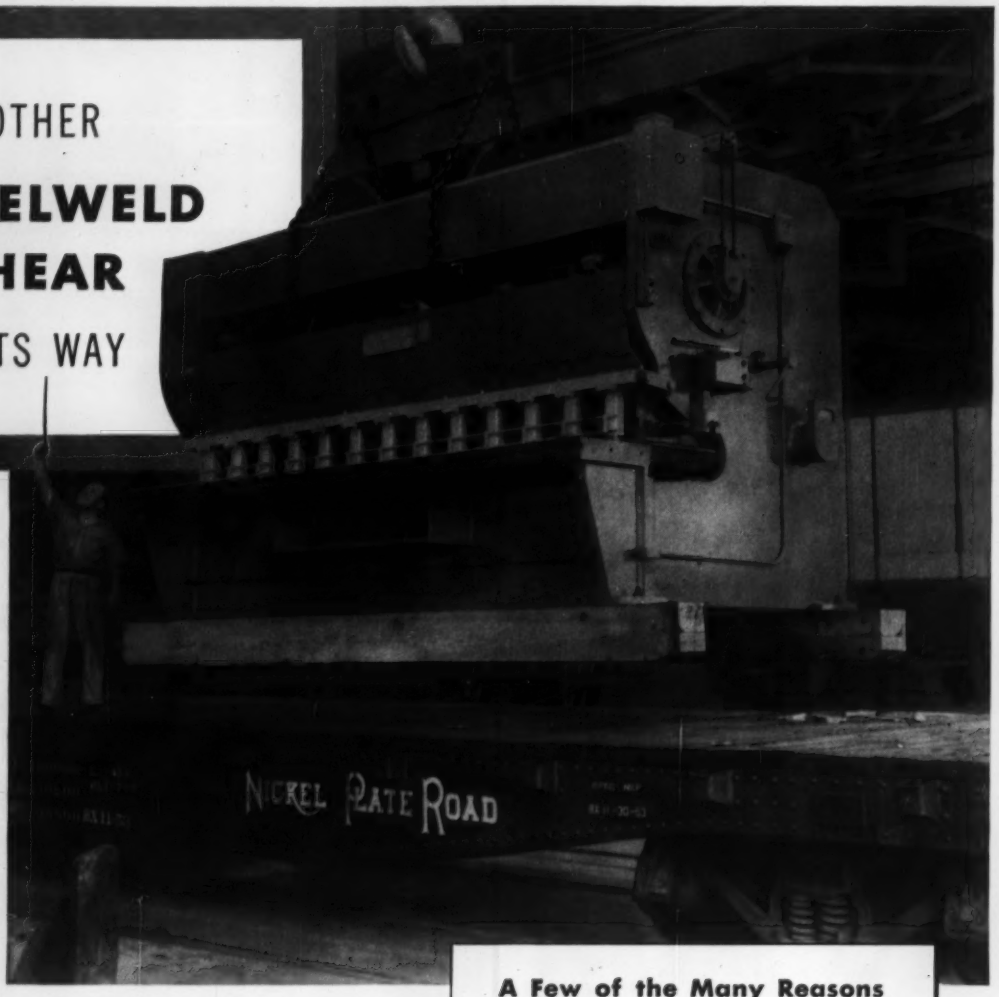
ANOTHER **STEELWELD SHEAR** ON ITS WAY



From every angle a Steelweld shear looks good — and is good. This machine is rated for 12'-0"x½"steel

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For smooth, accurate burr-free cutting, Steelwelds can't be beat. For ease of operation they have no peer. Their heavy construction and means for simple, easy maintenance assure long trouble-free life.

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STEELWELD PIVOTED BLADE SHEARS

Gears are broached two at a time. Gage check (right) keeps part within tolerance of 0.0008 in. on the involute form. Next operation is shaving

Broaching with a Twist

Broaches are pulled up through idler gear to cut internal teeth. Guide bars control broach twist to cut the helical involute form. Tolerance is 0.0008 in. on the involute

A DETROIT automotive supplier is broaching internal gear teeth in a reverse idler gear at the rate of 140 pieces an hour. The operation is automatic; all the operator has to do is keep the magazines loaded.

The helical internal involute gear is 14 pitch. Broaching finishes the ID concentric with the pitch diameter of the involute teeth and maintains pitch diameter concentric with the OD within limits. After broaching, the teeth are shaved, removing 0.001 in. on a side.

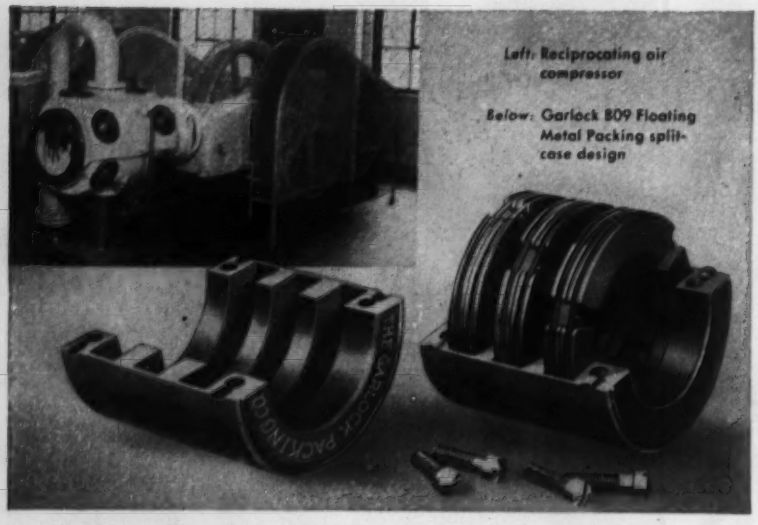
Cycle—The operator loads workpieces in two magazines and starts the machine cycle. Two parts feed into the slide and are transferred into broaching position. The broaches move up through the parts, engaging the broach pullers, which pull them through, cutting the helical involute teeth from the solid stock.

When the stroke is finished, the slide moves the parts out and ejects them below. After the broaches return, the slide moves two more parts up from the magazines and the cycle repeats.

Machine—The job is done on a vertical hydraulic internal pull-up broaching machine with two-station helical drive. Two lead bars, 3¾-in. in diameter, drive the broach pullers through a gear train. The bars operate independently, so it's possible to use the machine for broaching two parts of different leads.

The hydraulically operated retriever unit, engaging the broach rear pilot is designed to follow up throughout the entire broaching stroke, so the broaches are supported at the rear pilot until the last broaching tooth has passed through the workpiece. The unit remains in the up position after the broach rear pilot is disengaged at the end of the broaching stroke. It stays in this position ready to receive the broach pilot for the return stroke of the slide.

In normal production, the machine, built by American Broach & Machine Co., division of Sundstrand Machine Tool Co., Ann Arbor, Mich., produces 140 pieces an hour at 100 per cent efficiency, using a broaching speed of 17 fpm. At full speed (22 fpm), the machine turns out about 200 pieces an hour.



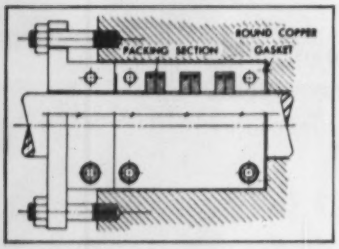
Left: Reciprocating air compressor

Below: Garlock 809 Floating Metal Packing split-case design

For air compressors, users report

GARLOCK SPLIT-CASE METAL PACKINGS

have 2 big advantages



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2. **CAN BE INSTALLED *WITHOUT* DISCONNECTING THE ROD.** Downtime is reduced to a minimum.

You can eliminate the cost of frequent packing replacements and unnecessary downtime by installing Garlock split-case metal packings on your reciprocating air compressors. Service reports show that these Garlock metal packings have given 15 years and more of trouble free service with a minimum of rod wear.

For complete information, call your Garlock representative or write today for Brochure 3889.

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Watchdog Television

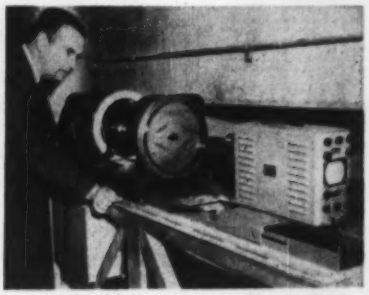
It's on lookout for off-center loads which might ruin massive 35,000-ton forging press

A TELEVISION CAMERA is the third eye of the operator who controls the 35,000-ton forging press in the Air Force's heavy press plant at Alcoa's Cleveland works.

The camera is on the lookout for off-center loads which might work against the accuracy of the massive press or even ruin it.

Deflection — The complicated shape of a forging sometimes causes eccentric loading of upper and lower platens. A limited amount of eccentricity has been compensated for. The degree of deflection must be measured by the stretching of huge tie rods, which hold the press within safe operating limits. Such distortion is reflected in the four hydraulic cylinders at each corner.

Small hydraulic lines connect each cylinder to the mechanism viewed by the TV camera. It duplicates in miniature the observed differences.



DIAMOND GAGE AND CAMERA
. . . receiver is at control station

What Operator Sees—When the press is centrally loaded, a beam of light is focused in the center of a diamond-shaped gage viewed by the camera. If loading is off center, the beam moves from the center toward a border of the diamond, disclosing the location of the load center. Noting this movement, the press operator can take corrective action.

Should he fail to act quickly enough, the light touching the boundary of the diamond shape automatically takes control from the operator, stopping all movement before the press can be damaged.

Heavy-Duty Tire

Of one-piece forged steel, this concrete mixer drum tire gets weighty service

A CRITICAL COMPONENT of truck concrete mixers is the steel tire on which the drum rotates.

Mounted at the rear of the mixer unit, the tire has to withstand shifting weights of up to 40,000 lb without cracking loose from the drum shell, losing concentricity or developing flat spots.

Functions — The tire performs three vital functions on the mixer. It stabilizes the drum; it transmits the drum load to the supporting rollers; and it provides the support for one end of the drum.

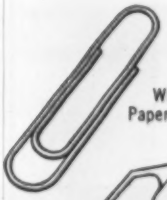
Tires for mixers made by Blaw-Knox Co., Pittsburgh, are forged under closely controlled conditions at the Standard Steel Works Division of Baldwin-Lima-Hamilton Corp., Burnham, Pa. The high-carbon steel rings are 51½-in. in diameter, 3 in. wide, 1½-in. thick and weigh over 200 lb. They are hot roll forged to impart tough physical properties and then rough machined.

FORGED STEEL TIRE
. . . is welded to cone section of drum

Fabrication—The tires are assembled to the mixer drums in a special welding fixture (see photo). First, the tire is slipped over the cone of the drum and tack welded. It is finish welded by hand, using a low-hydrogen electrode. The roller track is finish machined on a 5-ft boring mill.

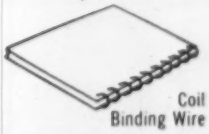
The drum itself is high-strength, low-alloy steel, which is abrasion resistant to withstand the punishment meted out by sand and gravel. The rollers on which the tire and drum rotate are of SAE 1045 steel, machined and flame hardened.

Whatever your problem is in ***Wire...***

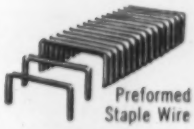


Wire for Paper Clips

Piano Covering Wire



Coil Binding Wire



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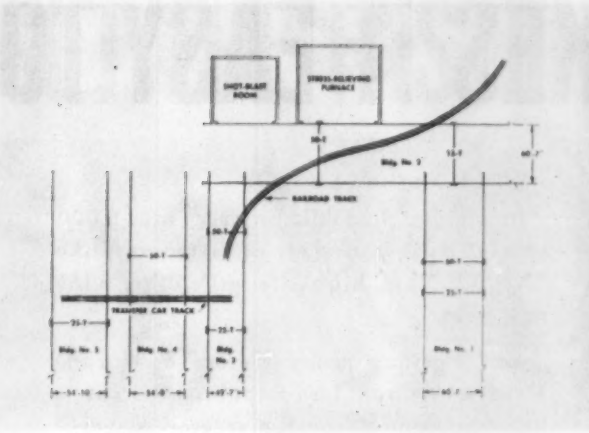


Schematic crane layout at Danly Machine Specialties Inc.

Precision Handling Speeds Press Building

OVERHEAD CRANES work three shifts a day, six days a week, moving king-size press components at Danly Machine Specialties Inc., Chicago.

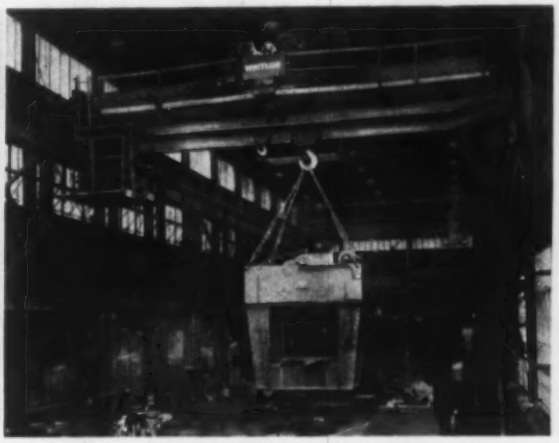
Danly presses, even the largest ones, are completely assembled and tested before shipment. This saves valuable installation and adjustment time for buyers, but it adds to the press builder's handling problem.

Coverage—Weldments and subassemblies weighing many tons constantly move between the fabricating and machining areas of the big plant (five connected buildings). Backbone of the materials handling system, which covers the entire plant, are nine Whiting cranes.

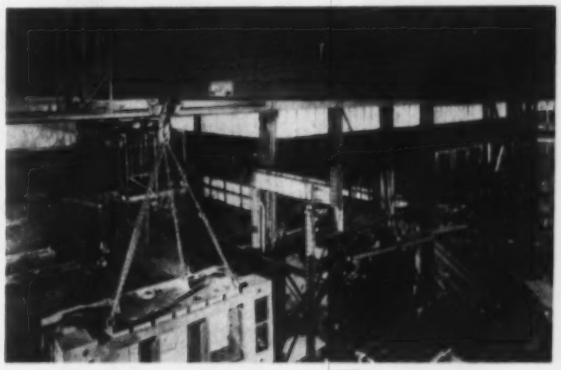
These cranes are responsible for almost all inter-building handling. Crane runways extend from one building into another, making it possible to transfer lifts from building to building without intermediate handling.

Setup—In building 1, heavy steel plate is cut and welded. Shot-blast cleaning and stress-relieving of weldments are done in building 2. Buildings 4 and 5 are machining areas. All weldments and subassemblies go to buildings 2 and 3 for final assembly and testing.

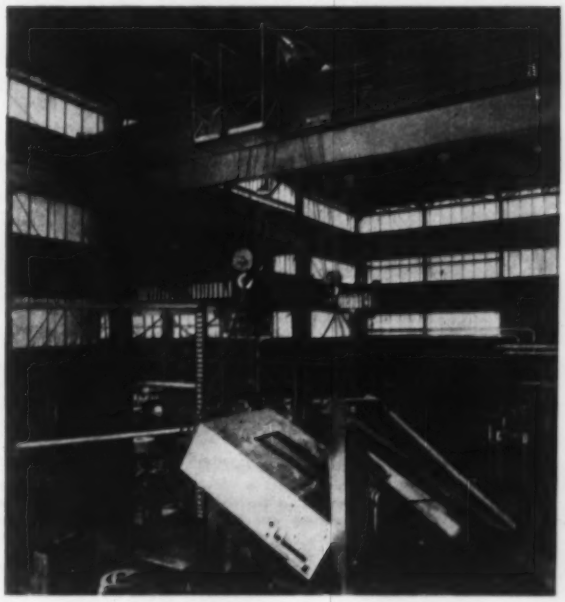
Because its press building is so dependent upon the handling system, Danly takes good care of its cranes. They are inspected each week. Necessary cleaning and lubrication are done, and electrical parts and contacts are replaced according to schedule.



A 50-ton crane in building 2 carries press to building 3. At crane transfer point, where two buildings connect, another 50-ton crane will pick up press and take it to final assembly area



A 45-ton weldment on crane in building 2. Another crane is standing by in building 1 to pick up the part. Note how crane rails in building 1 extend into building 2



A 19½-ton weldment is turned over with a 50-ton crane and a 10-ton auxiliary hoist

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One call to your Republic Bolt and Nut Distributor gets all the fasteners you need for assembly and maintenance work. There's no shopping around to get the types and sizes you need. There's no time lost. Paper work is reduced. One order, one invoice, one shipment covers everything.

And even though your distributor might be temporarily out of a particular item you require, he can get it for you in a hurry. Republic's Bolt and Nut Division backs him with one of industry's largest stocks of headed and threaded products. More than 20,000 standard types and sizes of fasteners are made and stocked by Republic. Everything from machine bolts, cap screws, hot and cold punched nuts to rivets, track bolts, alloy studs, sheet metal screws.

In addition, Republic produces over 8,000 special types and sizes of fasteners—like "Nylok" Nuts, high-strength bolts, mine roof bolts.

You're getting quality in every sense of the word when you buy Republic Fasteners. Republic controls quality at every stage of production—from raw materials to finished fastener. Republic uses its own ore, makes its own steel (over 50 analyses of carbon, alloy and stainless), employs the most modern machines and procedures.

You can depend on Republic Fasteners for uniformity, ease of application, long service life, quality. Quick delivery, too.

Contact your industrial distributor. Or mail the coupon for additional information.

REPUBLIC STEEL

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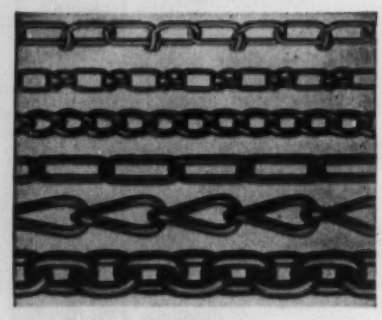

CHAIN FOR EVERY INDUSTRIAL REQUIREMENT. Republic's Round Chain Division offers a complete line of welded and weldless chain, chain slings—plus every type of fitting, attachment and accessory. Strategic location of Republic Chain plants and warehouses assures you of prompt delivery through your Republic Distributor.

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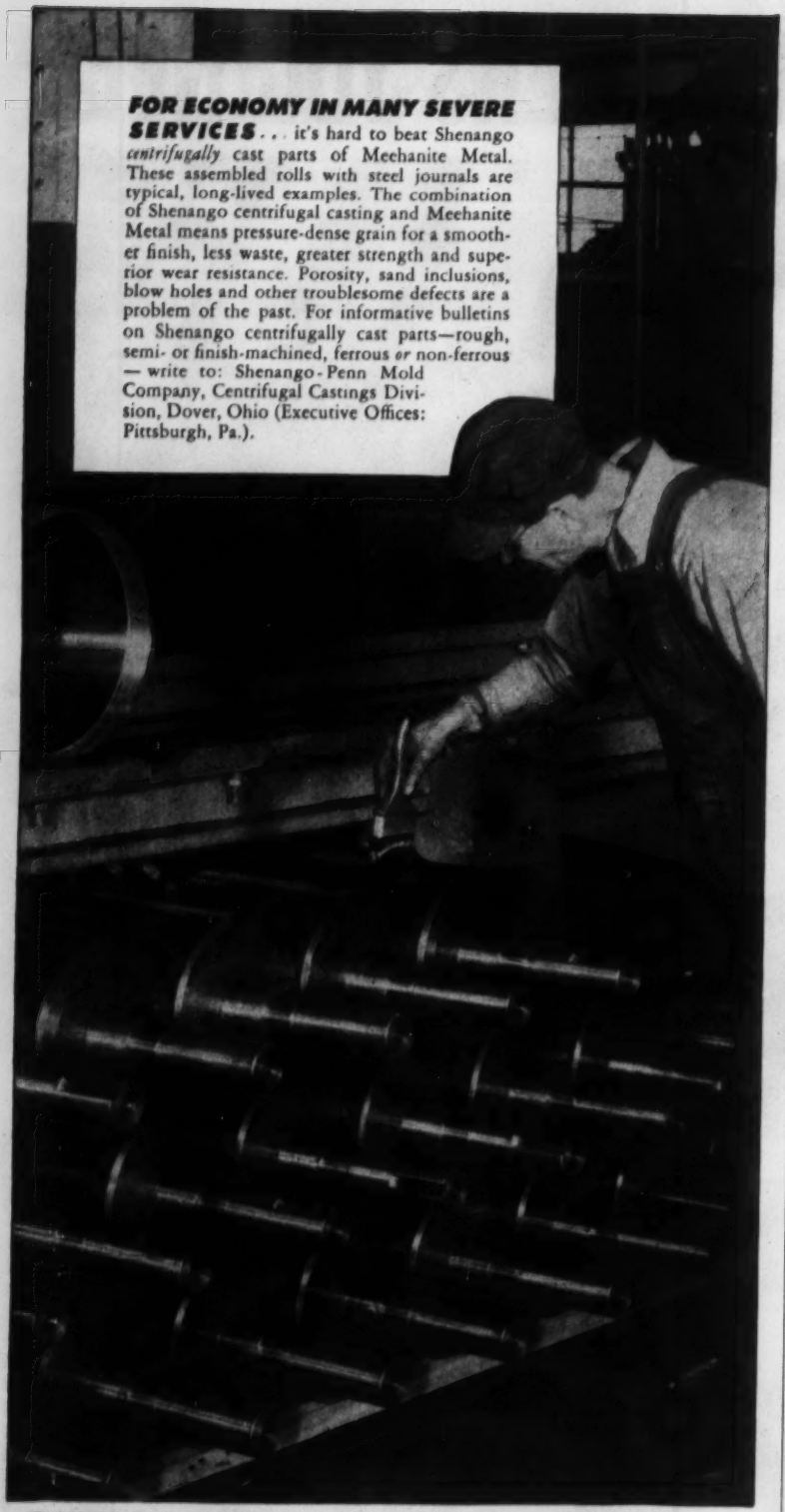


FOR ECONOMY IN MANY SEVERE SERVICES . . . it's hard to beat Shenango *centrifugally* cast parts of Meehanite Metal. These assembled rolls with steel journals are typical, long-lived examples. The combination of Shenango centrifugal casting and Meehanite Metal means pressure-dense grain for a smoother finish, less waste, greater strength and superior wear resistance. Porosity, sand inclusions, blow holes and other troublesome defects are a problem of the past. For informative bulletins on Shenango centrifugally cast parts—rough, semi- or finish-machined, ferrous *or* non-ferrous — write to: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio (Executive Offices: Pittsburgh, Pa.).

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • MONEL METAL
ALUMINUM AND MANGANESE BRONZES • NI-RESIST • MEEHANITE METAL

Tip for Diecasting

Made of beryllium-copper, a plunger tip has outlasted 10 previously used tips

A BERYLLIUM-COPPER plunger tip on a B & T, 450-ton, cold-chamber diecasting machine is still in good condition after more than 51,000 cycles.

Ohio Die Casting Co., Columbus, O., is using the tip for such jobs as forming locknuts for the plumbing industry from molten aluminum (1200°F) at the rate of 150 to 160 cycles an hour.

Dimensions—The tip is 4 in. long and 2 in. in diameter. It is made of Berylco No. 10, supplied by the Beryllium Corp., Reading, Pa. The tip was hot rolled, annealed, turned and heat treated.

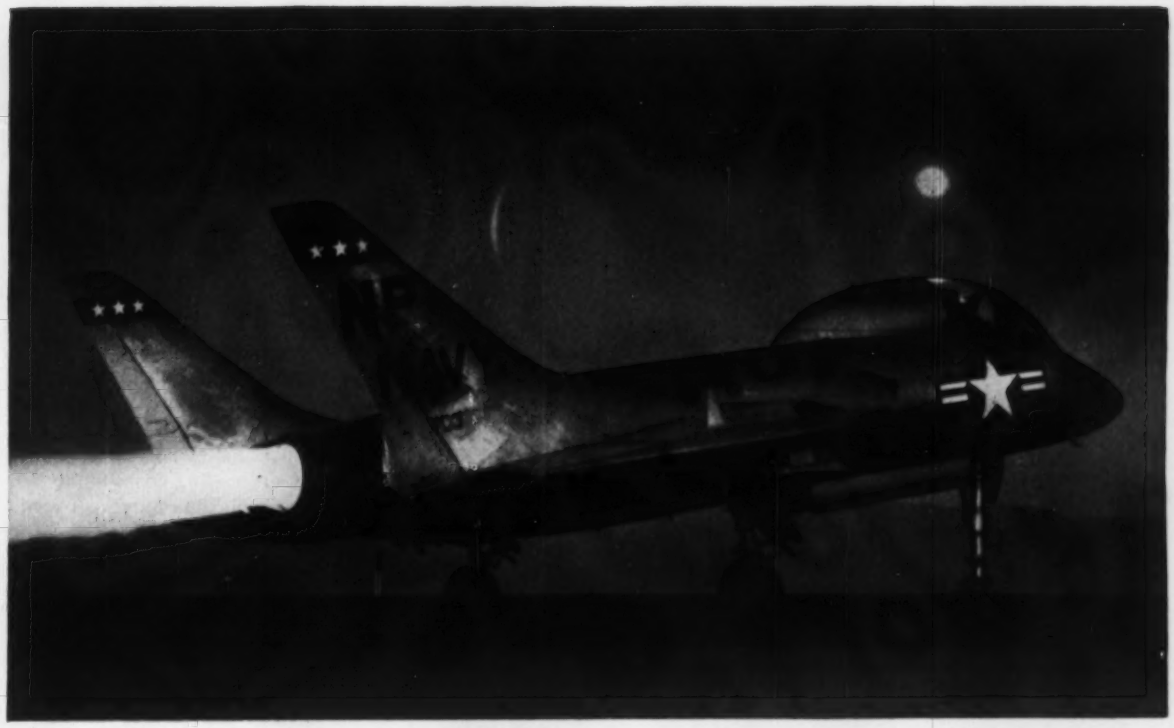
The beryllium-copper tip permits the Columbus firm to use 0.0005-in. clearance between tip and sleeve. Close tolerances, in turn, increase the life of the tip.

MUCH-USED TIP
. . . shows slight scoring and feathering

Alloy Properties—Beryllium-copper combines good thermal conductivity with high tensile strength and endurance. It has wear resistance comparable to steel.

These are definite advantages in plunger tip operation. As the tip moves in to feed the aluminum to the die, the impact tends to peen the edges of the tip outward against the sleeve. This is a desirable effect, since it tends to preserve close tolerances.

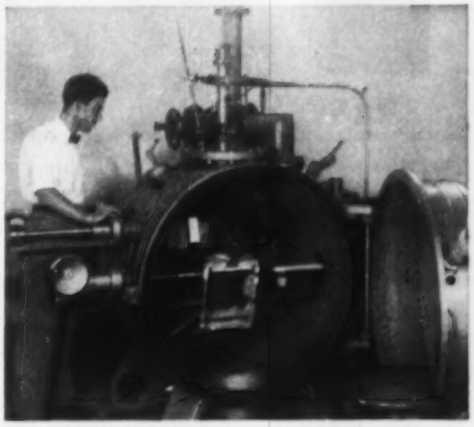
As the tip wears, it feathers at the inlet end around the plug. When feathering becomes excessive, the tip is removed, the edges pounded out, and the tip is turned down so it will fit the sleeve.



Will Vacuum Melted Metals do for YOUR Product what they do for Jet Planes?

A Vacuum Furnace will help you get the Answer

The roaring gas turbines of 1000 mph jet planes use vacuum melted metal parts to withstand temperatures and stresses that would ruin conventional metal. If you use metal under severe conditions in your product . . . or require "cleaner" metals for smoother surfaces, you should be testing vacuum melted metals today. A high vacuum furnace will help you speed up these tests by supplying your researchers with a ready supply of varying alloys. We have made and operated more high vacuum furnaces than anyone in the world. Can we help you, too? Send coupon below today.



NRC Model 2555 Vacuum Furnaces are now being used by leading aircraft companies, engine manufacturers, investment casters, specialty steel producers to speed up the development of new materials that will meet ever more severe operating requirements.

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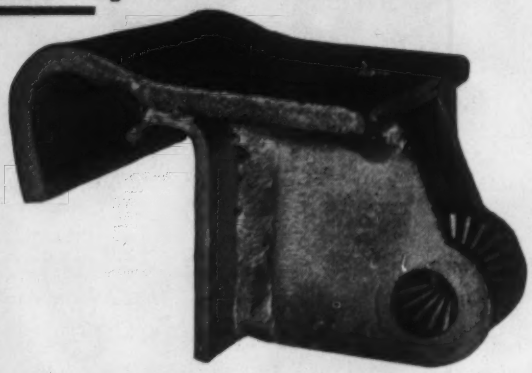
Why four pieces of metal?



. . . with necessary cutting, punching, forming and welding!

. . . How about

Malleable?

Stronger one piece malleable iron casting with better appearance

Better material selection exemplified by this trailer hitch is an everyday development in the malleable iron foundry industry.

The improved design, and therefore *appearance*, is quickly apparent. The big advantages are greater uniformity and dependability, and increased strength—*at lower cost* (in this case, 25% lower cost to the customer). The unit is completely stress relieved and benefits from a better distribution of metal than its fabricated predecessor. Improved damping properties and corrosion resistance are additional gains.

If you are not using malleable iron's remarkable properties, it will pay you to call a malleable foundry and go over your products with their engineers. Skilled in casting design, they show you how to save money and improve your products with Malleable Iron Castings.

Malleable FOUNDERS' SOCIETY

1800 Union Commerce Building Cleveland 14, Ohio

Seal for Castings

Polyester resin sealant cuts costs and cycle time in processing aircraft engine parts

THE SHRINKAGE in molten metal as it cools opens up tiny pores in castings through which oil can leak. When the castings are for aircraft engines, this becomes a major fire hazard. Pores must be sealed.

Lycoming Division, Avco Mfg. Corp., Stratford, Conn., found that by using Impco RC-2, a compound based on Bakelite polyester resins, it could cut sealing costs by 20 per cent and cycle time by 40 per cent.

Before — Previously, it took 8 hours or more to seal magnesium alloy castings of engine parts. Frequently, castings were cycled two or three times.

Castings now are sealed in less than 5 hours in one cycle.

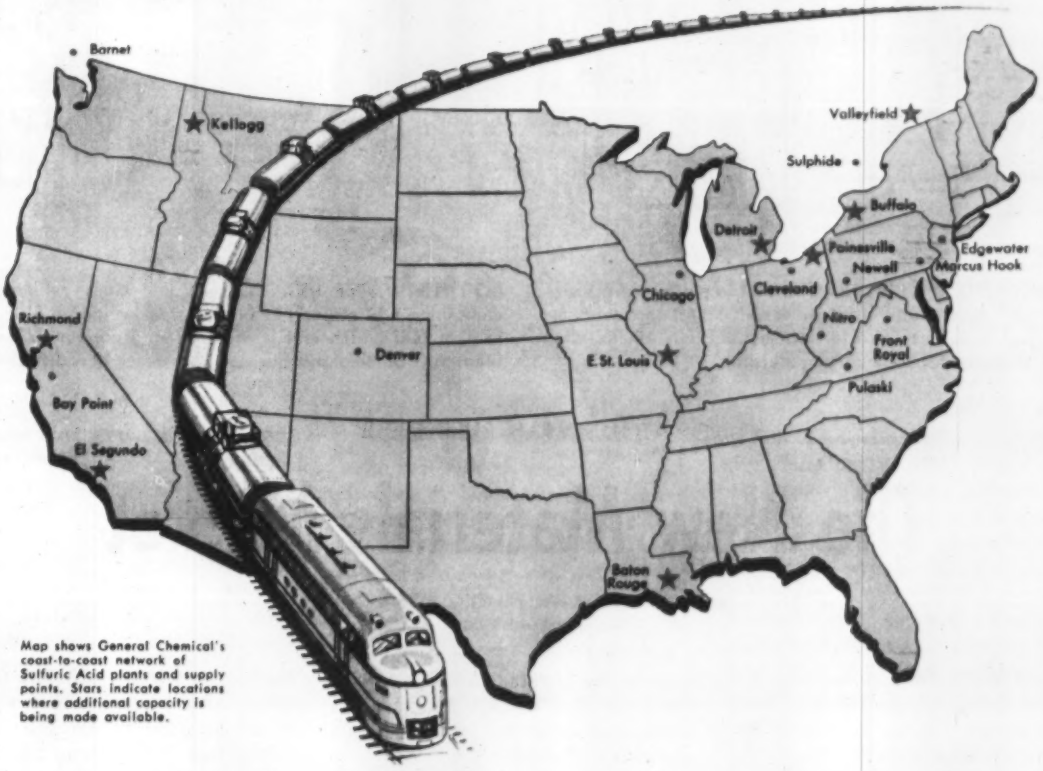
Procedure—Parts are placed in a pressure vessel. A vacuum is drawn to remove all air from the pores, and then air pressure is applied to thoroughly impregnate the casting.

IMPREGNATED CASTING
. . . shows no leakage under water

Castings are rinsed with warm water and a mild detergent to remove excess resin. Previous sealants required flammable solvents to remove excess film. Cleaned castings are put in a tank of hot oil at 270°F to cure the resin.

The polyester sealant gels quickly and forms a hard solid in 60 to 90 minutes. Each casting is tested for leakage under water at 180 to 200°F at pressures to 70 psi.

An 80-Mile Train of New Sulfuric Acid Production!



Map shows General Chemical's coast-to-coast network of Sulfuric Acid plants and supply points. Stars indicate locations where additional capacity is being made available.

General Chemical Expands Capacity from Coast to Coast!

In an expansion that extends to all points of the compass, General Chemical is providing an additional 600,000 tons of Sulfuric Acid annually, with increased production facilities . . .

- ★ West at El Segundo and Richmond, Calif.
- ★ South at Baton Rouge, La.
- ★ North at Valleyfield, Que.*
- ★ East at Buffalo, New York
- ★ In the Mid-west at Detroit, Mich., Painesville, Ohio and E. St. Louis, Ill.

This means approximately 12,000 more tank cars of Sulfuric Acid available to meet growing requirements of industry . . . a train load 80 miles long! Some of these new facilities are already in production, and the others are scheduled for completion in 1956.

As America's foremost producer of Sulfuric Acid, General Chemical recognizes a responsibility to keep pace with industry's need for this vital basic chemical. No matter where you are located, you are within a short, low-cost haul of a primary producing center of General Chemical Sulfuric Acid. Remember . . . in emergencies and at all times . . . General Chemical is your dependable source of Sulfuric.

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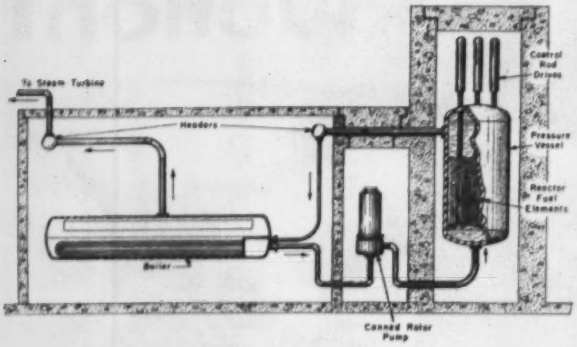
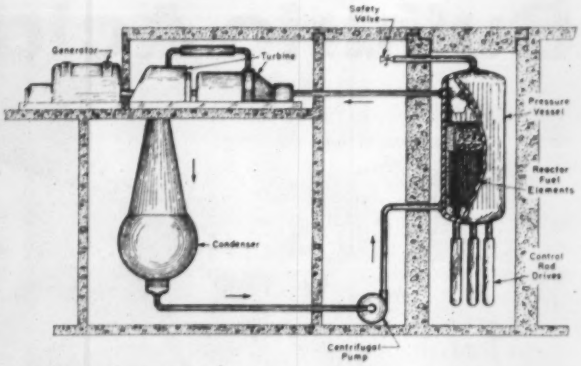
Five Types of Reactors for Power Plants



PRESSURIZED WATER REACTOR—Circulates pressurized water or heavy water through vessel containing solid uranium fuel elements. Water passes through boiler where steam is made to drive turbogenerator



BOILING WATER REACTOR—Water boils within vessel containing fuel elements. No heat exchanger is used. Fairly high fuel enrichment is required and condenser and turbine must be shielded because the water is radioactive

ATOMS MEAN BUSINESS II

The New Materials Market

By DR. ALLEN G. GRAY
Technical Editor

ALTHOUGH uranium is the Cinderella metal of the atomic age, many others will be needed in increasing amounts.

Each component of a nuclear reactor poses its own materials problem. All must meet these basic requirements: Strength, corrosion resistance and dimensional stability. In addition, they must have nuclear properties—because of them, a number of metals, unknown commercially a few years ago, are in the limelight. Among them are zirconium and hafnium.

Zirconium is important because it absorbs only a few of the neutrons generated in the fission process and does not interfere with the reaction. Hafnium is valuable for the opposite reason. It absorbs many neutrons and is used in control rods to quench atomic fires.

Complex—The core of a nuclear reactor contains many structural components: Supports or containers for fuel and moderator; ductwork, piping, valves, and fittings; control-rod sleeves and mechanisms; shells, baffle plates, header chambers and closures. Part I of this article (STEEL, Oct. 31, p. 66) discussed the market for components that could be made in metalworking plants.

Requirements for materials in these applications are in general: Adequate strength, fabricability, thermal and radiation stability, corrosion resistance and satisfactory nuclear properties.

Nuclear requirements cut the list of metals for thermal reactors to four: Zirconium, beryllium, aluminum and magnesium. They are the only ones that have low neutron absorption (less than 0.5 barn/atom).

Preferred—High melting point, excellent fabricability and good corrosion resistance give zirconium a top spot as structural metal for the core of a thermal reactor. But the pure metal is still difficult to produce, is expensive and creeps more than is desirable. Corrosion resistance to hot water and hot strength are improved by alloying it with tin (a few per cent).

Beryllium has good moderating characteristics as well as a high melting point. But the supply is limited; it's toxic, difficult to fabricate and its corrosion resistance is not so good as zirconium's.

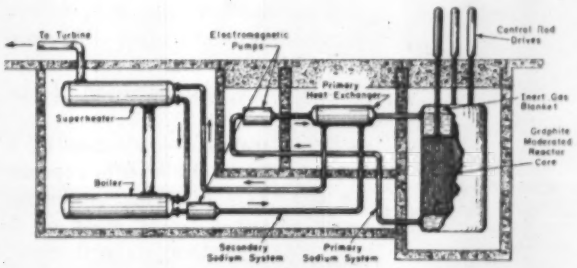
The two low neutron absorption metals left are aluminum and magnesium. They are not high temperature metals. Aluminum is used a great deal in low temperature research and production reactors.

The future may see more attention to magnesium because of its low neutron absorption and abundance. Poor corrosion resistance is one stumbling block.

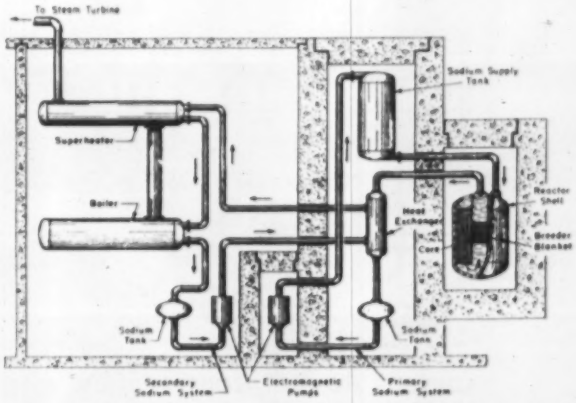
More Metals—If higher neutron absorption can be tolerated, the list of metals for structural uses grows. Many of these can be used in small quantities in a thermal reactor—more extensively in the intermediate or fast reactor.

Metals with moderate absorption and high melting points are: Columbium (niobium), iron, molybdenum, chromium, copper, nickel, vanadium and titanium.

Columbium has good mechanical properties, but the supply is short. Pure chromium metal is not suitable for structural use. Stainless



SODIUM GRAPHITE REACTOR—Sodium pumped through graphite moderated reactor extracts heat to make steam to drive turbine. Liquid metal allows high temperature operation, gives high thermal efficiency



SODIUM COOLED FAST REACTOR—Sodium extracts heat from unmoderated plutonium core which is converted to steam. Uranium blanket surrounds core to utilize escape neutrons and breed new fissionable materials

steels combine good corrosion resistance with good mechanical properties at moderately high temperatures.

Looks Good—Ductile vanadium, now commercial, is promising from strength and corrosion standpoints. Molybdenum is the best candidate for high temperature use. Refractory properties and unusually high thermal conductivity are points in its favor.

Titanium stands a good chance for use in intermediate reactors because of its high strength-weight ratio, good corrosion resistance and other good physical properties.

As temperatures go up, nickel alloys, such as Nichrome, Illium, Hastalloy and Inconel, will come into the picture.

Beyond the Metals — Ceramics are the only good prospects for structural elements for ultrahigh temperature use. Oxides—beryllia, magnesia, silica, alumina and zirconia—are candidates. Carbides of beryllium, silicon and zirconium are possibilities.

Toughest problems: Overcoming the tension weakness and generally poor thermal shock resistance of the nonmetallics. Almost an endless number of combinations are possible—carbides with oxides, for example. The field of metal-ceramic combinations shows promise of adding strength and better thermal conductivity.

CONTROL MATERIALS

The best way to control the heat produced by thermal and low level intermediate reactors is to introduce material that absorbs neutrons. Absorbing controls may be introduced in a number of ways. The AEC's *Reactor Handbook* says they should have these properties:

NEED INFORMATION?

More facts on materials for atomic applications can be found in the Atomic Energy Commission's new 610 page *Reactor Handbook* Vol. 3, section 1. Official number of the book is AECD-3647. It's for sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. Price: $3.50

1. High ability to absorb neutrons.
2. Adequate strength for solid rods.
3. Light weight, so rapid movement will give only slight inertia.
4. Resistance to corrosion by coolant.
5. Stability under heat and radiation.
6. Good heat transfer properties.
7. Fabricability, availability and reasonable cost.

Top Spot—Boron and cadmium are the most widely used control materials. Hafnium, removed as an impurity from zirconium, is looking up because of availability and good corrosion resistance.

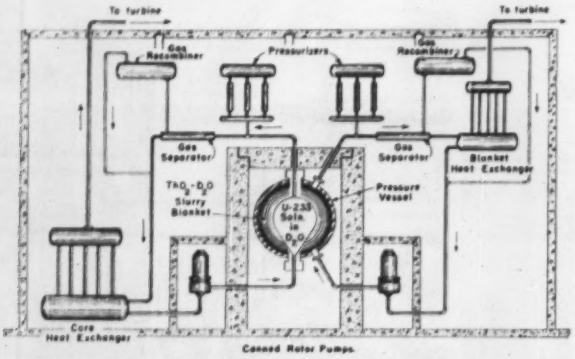
Mercury might find use as a liquid control material. Its high vapor pressure and reactivity with most metals is discouraging, especially for high temperature reactors.

Some of the heavier rare earth elements have a property that makes them especially well suited for control materials: Their neutron absorption does not fall off so rapidly as most materials when neutron energy is increased. If the demand grows, some of these metals may come on the market at reasonable cost for atomic use.

MODERATORS

Moderating materials are used to reduce neutron energy rapidly. This slowing-down power requires a material with low atomic weight and a high scattering cross section, meaning that particles which collide are deflected. For efficiency, low absorption for thermal neutrons is needed.

Beryllium and carbon are the only good solid moderators. Even though it's expensive, beryllium's low neutron absorption and its high moderating ratio have led to its use in a number of reactors. Its compounds—carbides and oxides—are refractory and make



AQUEOUS HOMOGENEOUS THORIUM BREEDER REACTOR—*Uses a solution of uranium in heavy water as fuel. It circulates through a tank surrounded by larger vessel that contains a thorium blanket to utilize neutrons that escape from core. This breeds new fissionable material*

good moderators for power reactors that must operate at high temperatures.

REFLECTORS

Since the function of a reflector is to reflect back into the reactor neutrons that leak out, the materials used must meet about the same nuclear requirements as the moderator: Good scattering characteristics and low neutron capture.

Others, Too—But the main job of a reflector is scattering. Many materials which have a high scattering property for fast neutrons but are not considered good thermal pile moderators are usable. These include metals with high atomic densities, such as iron; those in the upper end of the periodic table which are noted for high scattering ability, such as bismuth and lead; and breeder materials which also have high fast scattering properties, such as uranium and thorium.

Metals for moderator and reflector use must have all the qualities of a good structural material in addition to nuclear requirements. They include strength, fabricability, thermal and radiation stability and corrosion resistance. Needed also are good heat transfer properties to dissipate the energy given up by the neutrons hitting it.

SHIELDING MATERIALS

No one material meets all the demands of an ideal radiation shield around a nuclear reactor. This means that shields will be constructed of several materials, each having at least one of these properties: 1. A good moderating material to slow down neutrons. 2. A good absorber to take neutrons out of the field. 3. A dense heavy material to stop gamma rays.

The AEC's *Reactor Handbook* gives this list of materials that are useful in shields:

1. Amalgams. 2. Cement and concretes of special aggregates. 3. Ceramics and cermets. 4. Glasses and fused salts. 5. Metal ores. 6. Metals, alloys and sintered powders. 7. Organics—plastics, metal-loaded resins, silicones. 8. Silica and gels formed from boron-loaded solutions. 9. Water, hydrides, hydroxides, etc.

Useful—A great deal of work is being done on special concretes for shields. Points that favor concrete: It's a good structural material, can be handled easily and has enough hydrogen to moderate fast neutrons. But its density is low. This means an all-concrete shield will be thick.

Boron finds use in neutron shielding because it has an unusually high neutron absorption value.

Lead, tungsten and tantalum are heavy metals useful for shields. Gold, iridium, osmium, uranium and the rare earths might be employed if cost and availability were better. Lead and tantalum can be fabricated easily. Tungsten is shaped by powder metallurgy methods.

FUEL ELEMENTS

Reactor fuel elements are made up of a core, consisting of fissionable material in some diluent, and a cladding to protect the core from corrosion and to prevent fission-product contamination of the coolant.

Considerations—Selection of a material for fuel elements depends on many factors: Whether the reactor produces power alone or is to breed; whether it is thermal, intermediate or fast; temperature of operation; and corrosiveness of coolant.

Reactors being built use natural or slightly enriched uranium. They use slug-type fuel elements. Canned uranium slugs are being replaced by clad plates with uranium alloy core and a bonded coating of an alloy, such as aluminum-tin, zirconium-tin or stainless.

Limits—Aluminum clad fuel elements can be used only up to 400°F with water. Zirconium goes higher—up to 1000°F. Stainless steels have good strength and corrosion resistance at higher temperatures. Molybdenum looks promising for use up to 2500°F. But both molybdenum and stainless have the disadvantage of high neutron absorption and require a more enriched fuel.

Materials used in fuel element assemblies must stand up under the most difficult operating conditions. They must keep their strength under adverse conditions of temperature, irradiation, external loading and weakening caused by burnup. They must be stable dimensionally and resist many kinds of corrosion. Good heat transfer is important. This means: High thermal conductivity, large surface area, thin sections and no dead spots.

Canning materials should have good bonding characteristics and not react chemically with the core. Also, there must be minimum diffusion between core and cladding.

Extra copies of this article and Part I (components for atomic plants) are available in quantities from one to three until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

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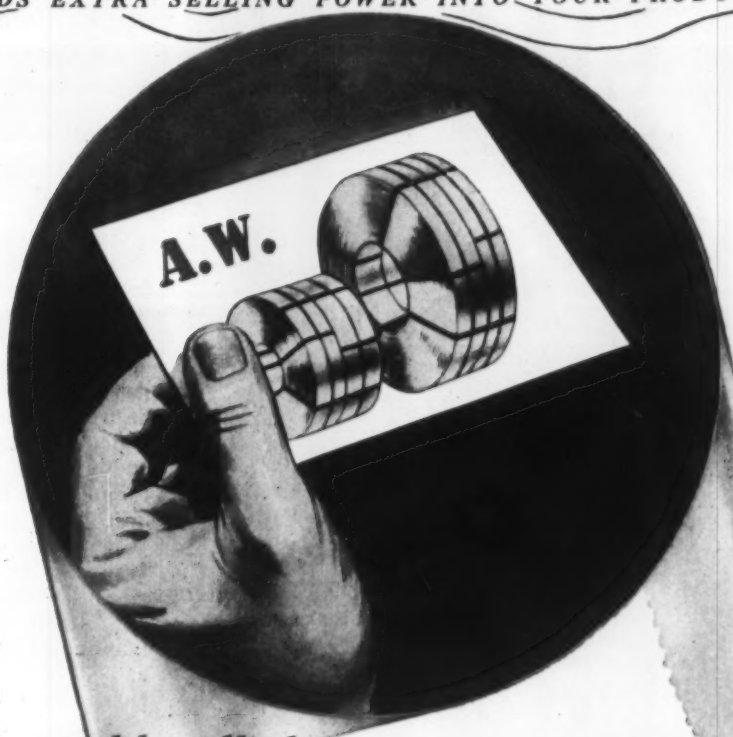

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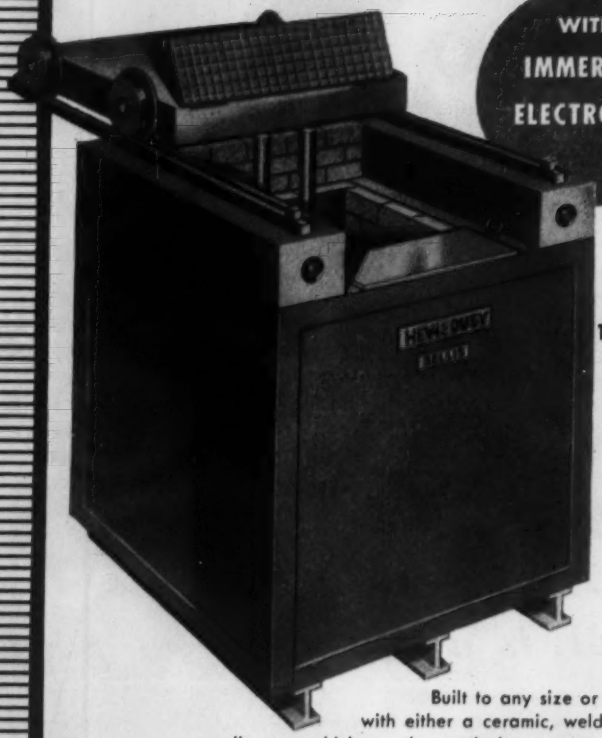

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Built to any size or capacity with either a ceramic, welded steel, or alloy pot whichever the particular process requires.

SPECIAL FEATURES of the HEVI DUTY BELLIS FURNACES

- Immersed alloy electrodes with the patented water-cooled terminals prevents the conduction of heat to the transformer.
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These features along with the many other advantages of salt bath furnaces such as versatility, economy, exact temperature control, mean to you savings in time, money, and material.

Send for complete information in Bulletin 655.

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Dry Type Transformers ***Constant Current Regulators***

Chips Get a Ride

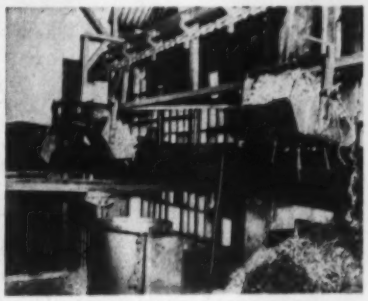
Loaded in conveyor pans, they travel up four floors and discharge into gondola cars

A CONTINUOUS chip conveyor system dumps 35 tons of machining chips daily into waiting gondola cars at the New Process Gear Co., Syracuse, N. Y. Except for manual loading, the operation is automatic.

Chips are collected from the machines on each floor by hand trucks and emptied into hoppers in the basement where the oil drains off. From the bins, workers shovel them into flat-bottomed pans, mounted at 10-ft spacings on a 4-in. trolley conveyor.

Route—Each pan carries about 40 lb of chips. Pans travel up through the fourth floor and out over the railroad siding to the line of gondola cars.

Pans pivot on bushings which are below the center of gravity and slightly off center to facilitate tipping. A spring-loaded latch-and-pin arrangement keeps the pans upright.

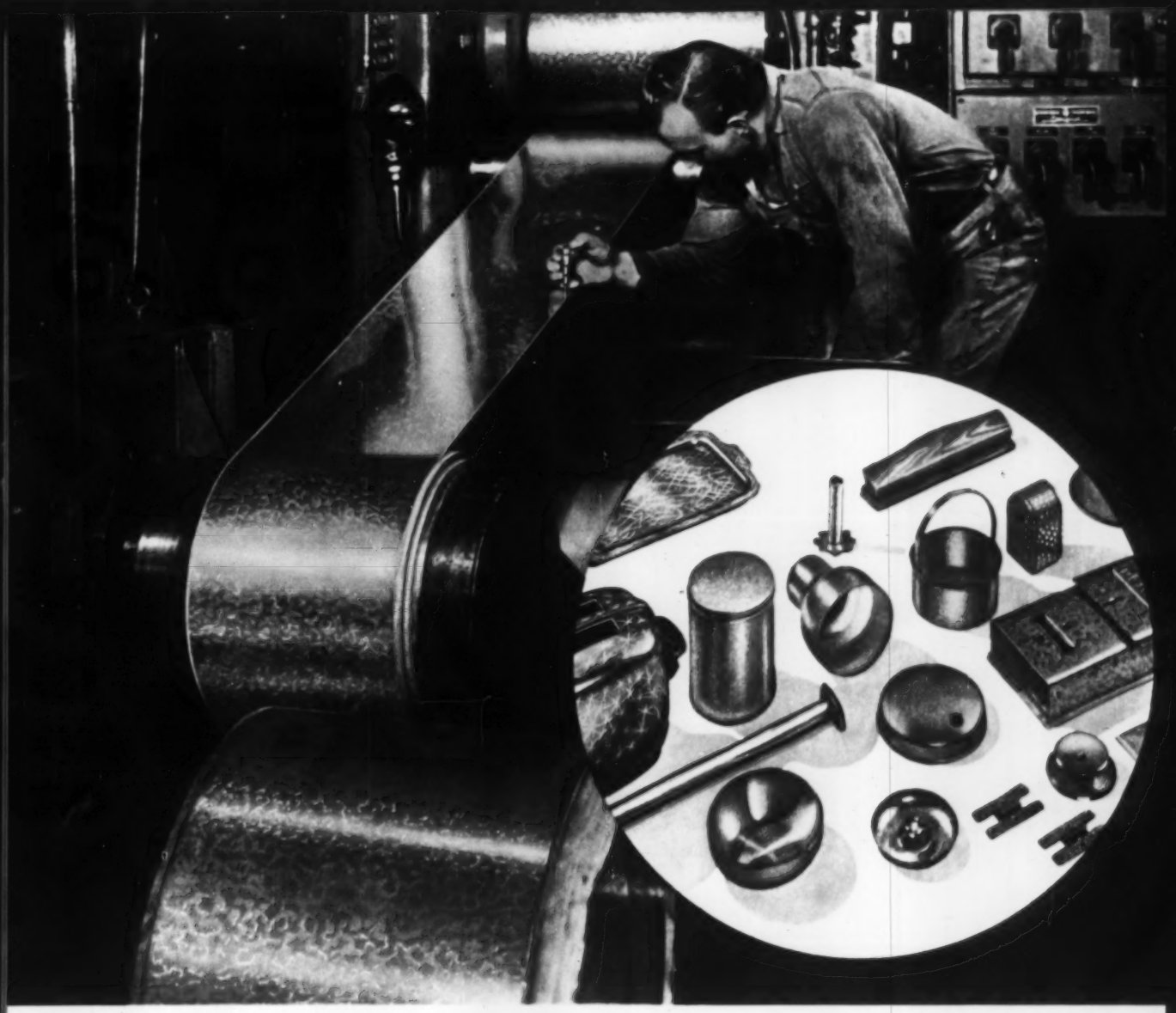


CHIP-LADEN PANS
. . . automatically dump their load

Dumping — At the dumping point, the latch extension strikes a hinged plate mounted beside the track. The impact disengages the pin, allowing the pan to tip to one side.

The chips pour out and fall into the gondola car below. Empty pans are returned to the upright a few feet beyond the dumping point by a cam rail acting on the low side of the pan.

Stop-and-start controls are at the dumping platform and the chip bins. The conveyor was installed by Lamson Corp., Syracuse, N. Y.



A Challenging New Product!

Steel strip with a rolled-in pattern design in a sparkling range of coatings and finishes

The new "Pattern Design" strip steel is offering product designers a challenging opportunity to improve product sales appeal, and at the same time, cut fabrication costs. It provides you with these advantages.

- You can now have almost any design you can draw on a piece of paper rolled into the surface of cold rolled strip steel.
- You can use it as plain uncoated steel or have it electrolytically coated with copper, brass, nickel, chrome, zinc or lead alloy . . . hot dip coated with lead alloy or tin . . . lacquer coated, either clear or colored.
- Coated strip, with the rolled-in design, is available to you in its attractive natural finish or in glittering planished or buffed finishes.
- The range of widths, thicknesses and tempers of steel makes it easy to fabricate at lower cost, and you gain the appeal of more expensive metals.

Developed by Thomas Strip engineers primarily for decorative purposes, this new product is finding eager acceptance in appliances, housewares, builders' hardware and other products. Why not write or call our closest district office today for complete details?

Thomas Strip

Thomas Strip Division

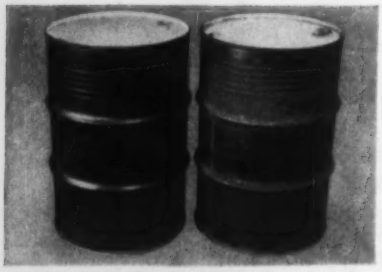
Pittsburgh Steel Company • Warren, Ohio

GRANODIZING PROCESS PRODUCES STEEL DRUMS FREE OF GREASE, DIRT, SCALE—AND RUST INHIBITED

Photo courtesy United States Steel Products Division, U.S. Steel Corp., Camden, N.J.

TREATMENT OF UNASSEMBLED SHELL, head and bottom drum sections is done in this power spray washer. Conveyer carries drum parts through five cleaning, rinsing and phosphate-coating stages. Drying oven removes moisture from parts prior to painting. Finish is durable and better looking.

5-stage process uses Granodine® to provide better paint adherence and underfinish rust resistance



1-YEAR EXPOSURE TO WEATHER proves the effectiveness of the phosphate coating. Untreated drum at right is rusted and pitted. Phosphate-coated drum at left has retained its finish. Coating provides a firm, durable bond for paint, retards corrosion.

In the Granodizing process, drums fabricated from steel are both freed from grease, oil and dirt and protected by a rust-inhibiting nonmetallic crystalline zinc phosphate coating over the entire inner and outer surfaces. Residues and contaminants are completely removed to assure high product purity.

Cleaning and phosphate-coating operations are done in a large high-speed power spray washer. Continuous spray phosphatizing machines such as this are used where large quantities of similar products are treated. Since Granodizing is effective only on greasefree surfaces, such machines must provide the steps necessary to remove all impurities. This is done by passing the work through five cleaning and rinsing stages.

The process as developed is another example of the technical assistance which ACP offers its customers. Our Engineering and Service Departments not only recommend the proper equipment, but instruct plant personnel in its operation, and check samples of the finished product in our own Quality Control Laboratory.

May we help you? Write or call us for complete information about Granodizing with Granodine.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

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CHEMICALS ACP PROCESSES

So Fully Packed

Storage area at Cleveland (O.) Division, Midland Steel Products Co., is stacked solid with auto frame parts. Only one aisle is needed since the large, 15-ton capacity Whiting crane spans the entire 95-ft width of the floor

Wire Cloth Blankets Industry

Wire cloth covers the whole of industry with its many and varied products. It is woven in a variety of patterns and metals to meet use requirements. Gages are sometimes so fine they are measured in ten-thousandths of an inch.

To make wire cloth, producers such as Reynolds Wire Division, National-Standard Co., Dixon, Ill., first draw the metal rod into wire. The wire is put on bobbins. These supply warp and filler wire to looms which convert the wire into cloth. Special machines split the cloth for particular uses.

Wire cloth has unique as well as general uses. It can insulate delicate instrumentation from stray currents, combining excellent conductivity for shielding with strength for permanence.

It can be used successfully as fanning mill cloth, because of its dimensional stability and accurate grading. Another unusual use is as a carrier of "wet lap" which comprises the woody fluid compound used to form hardboard.

As filter and strainer material, wire cloth serves the auto industry, aviation, railroads, the home and all manufacturing. It is made into radio grilles and auto brake linings; even the cream separator on the farm uses it as a basic element. As shaker screens, it grades rock, ore, abrasives, powder and coal.

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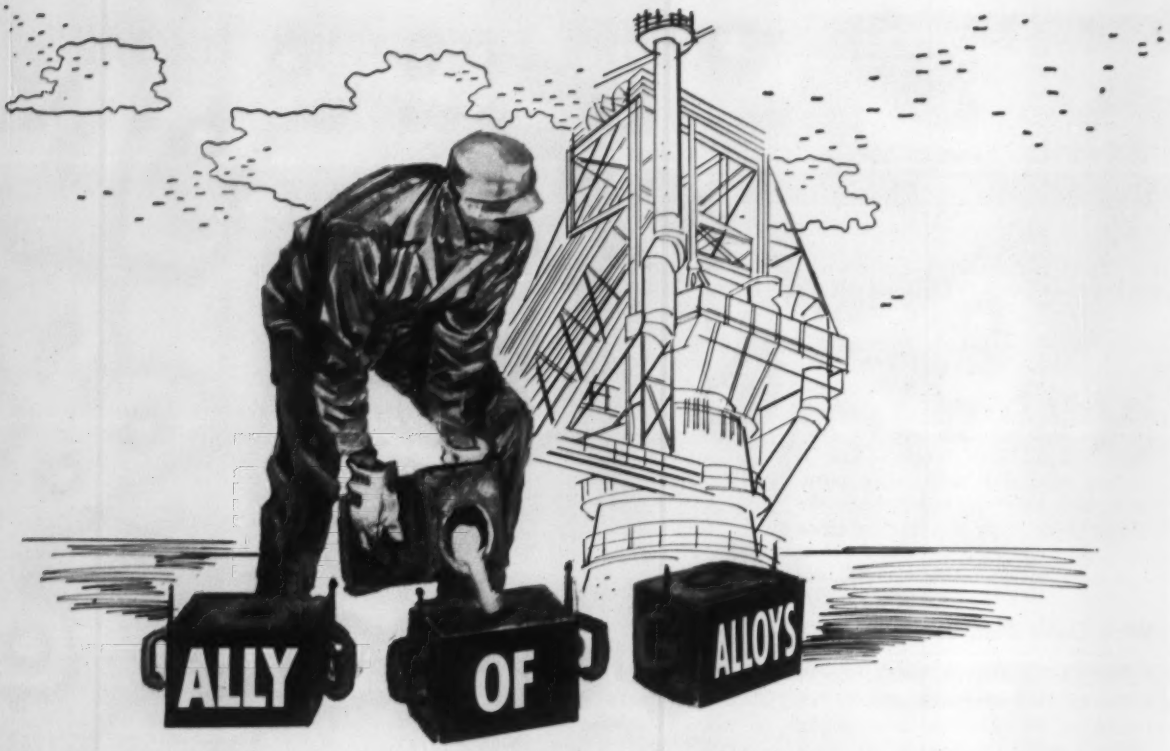

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Lithium, like metallurgy, has come a long way. Once a laboratory curiosity, lithium is now the "catalyst of industry." Once the art of separating metals from their ores, metallurgy now embraces a whole new industry devoted to the manufacture and treatment of the alloys of these metals. And now—still another new field within a field—Lithium Metallurgy.

Lithium Ingots are used in the degasification of copper. Lithium Cartridges are used in the refinement of high temperature copper, and in brass, bronze and nickel-silver castings. Even the salts of lithium (Carbonate and Chloride, specifically) hold great promise for heat treating.

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The lightweight, rigid-type, reinforced resinoid bonded wheels are used on portable disc and right angle grinders. They are made in 7 and 9-in. diameters and are 3/16 or ¼-in. thick. Centers are depressed.

Fast abrasive cutting action gives heavy stock removal; the wheels are used for rough, tough production grinding — grinding welds, removing flash and bead, cleaning up rough ragged surfaces and edges and for stainless steel.

The wheel is made of abrasive cutting particles and synthetic resin bonding agents, reinforced with alpha cellulose fibers crisscrossed and knitted together throughout the wheel mass. *Write*: Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa. *Phone*: Jefferson 5-6100

Universal Testing Machine Prints Test Results

Testing is reduced to pushbutton simplicity by this 60,000-lb-capacity unit. The operator merely inserts the specimen and starts the machine. Everything else is automatic, although the machine can be operated manually.

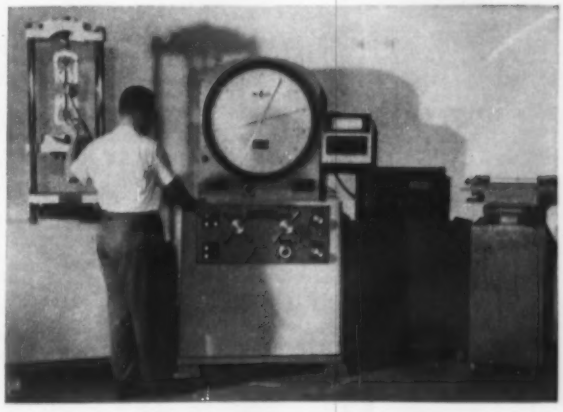
All phases of production tensile tests are controlled by a built-in programmer. Preset controls minimize the time needed to make successive tests and also insure uniformity of testing.

A separate electric typewriter automatically prints the yield strength for the selected percentage of offset, plus an identifying test number as each specimen is tested. Yield strength or other test data are determined immediately without time-consuming interpolation of a stress-strain curve.

The testing machine can be set to apply a uniform loading speed of from 0 to 3.5 in. a minute until the specimen fractures. Then the machine automatically returns to zero load and is ready for another sample to be inserted.

For high-speed testing, a predetermined control point and a yield speed time are set on separate dials. A fast approach speed, plus a slow yield speed and a fast tensile speed, are also selected.

When the machine is started, it loads rapidly at the approach speed to take up the slack in the specimen. When the control point is reached (just short of the expected yield), the loading rate is cut down to the slow speed specified for the material being tested. This speed continues for the preselected time through the yield determination, and then the specimen is loaded at a fast speed until it fractures.



The electric typewriter and a data converter make up the data printer. To operate it, the desired percentage of offset is selected on the converter control unit and the machine is started.

When the electronic stress-strain curve intersects with the desired offset, the electric typewriter automatically prints the load in pounds applied to the specimen at that instant.

The printing unit can be located any distance from the testing area.

Other new machines are a semiautomatic, air-operated Brinell hardness tester made of cast aluminum and an impact tester for making Charpy tests. *Write*: Tinius Olsen Testing Machine Co., Willow Grove, Pa. *Phone*: Osborn 5-7100

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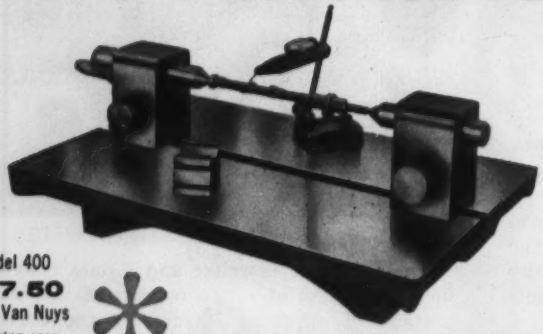

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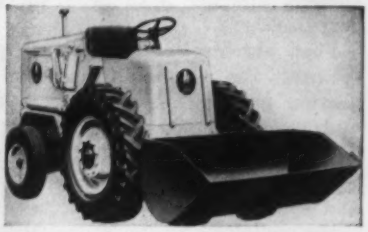
Pry-out bucket action is featured by this tractor. Capacity of the bucket is ¾-cu yd struck, 1 cu yd heaped. Carrying capacity is 3000 lb at 4 mph.

A short turning radius and rear-wheel power steering give fast maneuverability. A high lift of 7 ft 9 in. makes it easy to load trucks or elevated hoppers.



A 57-hp gasoline engine gives a top speed of 14 mph forward and 23 mph in reverse. *Write*: Frank G. Hough Co., 876 Seventh St., Libertyville, Ill. *Phone*: Libertyville 2-4000

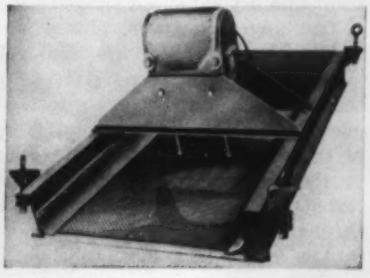
Tube Expanding Control

This electric control assures the same expansion of each tube after metal-to-metal contact regardless of small variations in size of tube and tube sheets. The control is a torque-limiting divice that can be used with any standard tapping motor.

A voltage regulator balances out outside variables that influence control calibration. *Write*: Lagonda Division, Elliott Co., Springfield, O. *Phone*: Fairfax 3-4695

Vibrating Screens

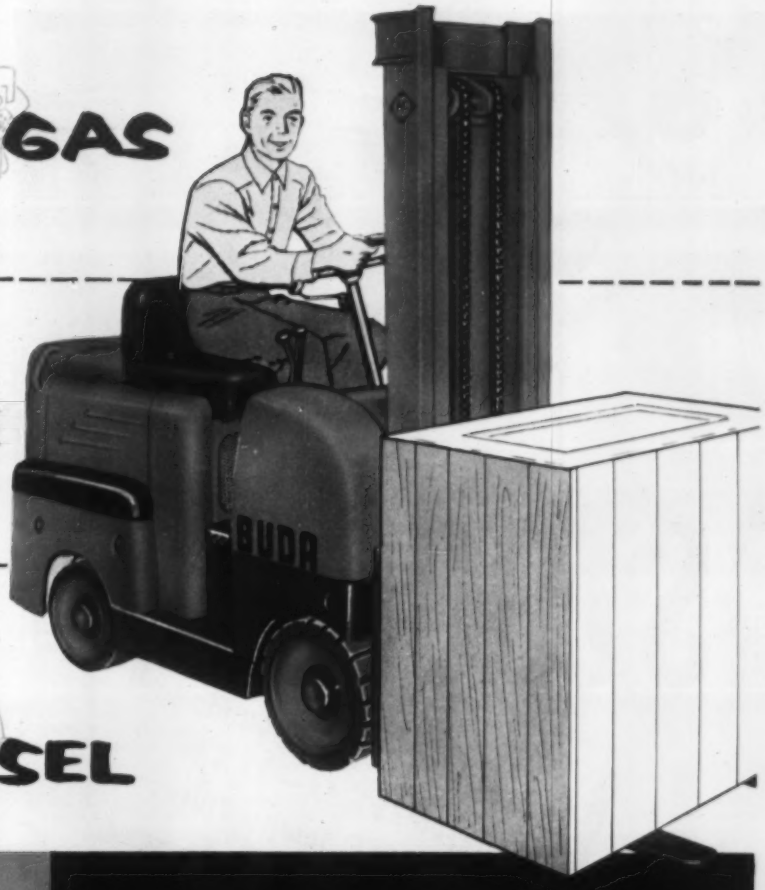
Scalping and rough sizing are done by these pulsating magnet vibrating screens. Powered by dust-sealed electromagnetic drives,



L.P. GAS

GASOLINE

DIESEL



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Buda Division, Harvey, Illinois

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ALLIS-CHALMERS

STOOLS

- weighing 10,000 pounds each
- alloyed 25% Cr—12% Ni
- for 1750°F. temperatures

DURALOY

These stools should offer a very pertinent tie-in with your casting requirements. Essentially, they are alloyed to resist heat. They're typical of the heavy high alloy castings we are equipped to turn out.

They will serve also to indicate what we can do in the way of producing castings to resist not only high temperatures but severe corrosion or combinations of heat and corrosion, as well.

Today, we can offer several distinctly different types of castings in the high alloy field including static, centrifugal and shell-molded.

Many in both the metal working and processing fields have come to look upon Duraloy as the leading producer of exclusively high alloy castings. This reputation has been built on many years production of sound castings properly alloyed. We'll be glad to discuss your high alloy casting requirements.

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NEW PRODUCTS and equipment

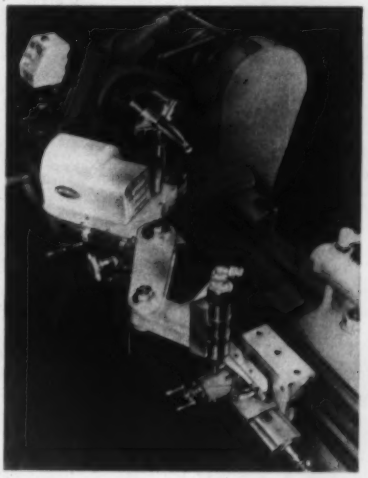
the new models have replaceable screening surfaces and rigid steel frames.

A tap switch in a separate electric controller adjusts to control the amplitude of the screen's vibration. *Write*: Syntron Co., 370 Lexington Ave., Homer City, Pa.

Precision Duplicator

This electronic duplicator is for lathes up to 16-in. in capacity.

The single-motion unit operates with a stylus pressure of 8 oz and is accurate to ±0.0015 in.



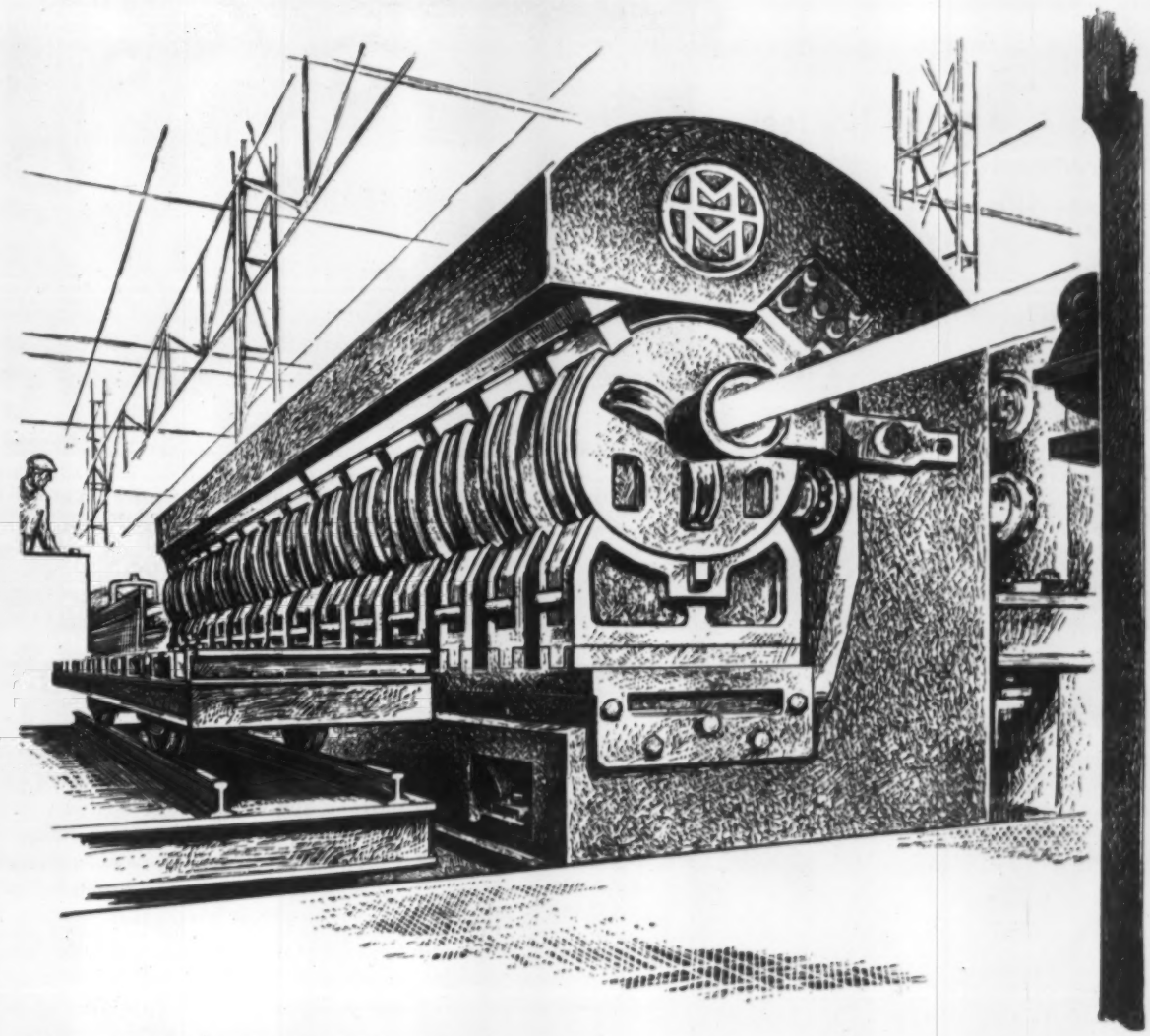
Standard tool bits are used; gages and form tools are eliminated; and the possibility of error is reduced. The duplicator is easily attached or removed. *Write*: Raytheon Mfg. Co., Waltham 54, Mass. *Phone*: Waltham 5-5860

Dust Control

This scrubber removes 99 per cent of microscopic solids, fumes and odors. When particles are below 5-microns, efficiency is 70 per cent.

Dust is collected by hydrocompressing exhaust gases through a system of tubes into a water chamber. This gives a highly efficient scrubbing action. The violent water agitation causes secondary pressure turbulence and additional scrubbing action in the tube chamber.

The scrubber comes in 15 sizes ranging from 500 to 40,000 cfm. Sludge can be removed constantly



Want Higher Pipe Production?

Stretch reducing to increase tonnage rating of existing pipe welding mills or to increase the potential output of new mills is one of the recent production improvements at Mannesmann-Meer. Welding or rolling large diameter standard sizes boosts tonnage of the original mill and puts the stretch mill to work to produce the smaller sizes.

But that's only half of the story. By applying the 3-roll arrangement to the stretch reducing mill, greater diameter and outstandingly high wall reductions together with an improved mill finished product have been made possible. Moreover, basic changes in overall mill design include a revolutionary new mill drive and an ingenious roll stand arrangement to suit today's need for extremely fast schedule changeover.

Plan ahead and develop today what you will ask for tomorrow is Mannesmann-Meer's approach to the problems of the pipe and tube industry. This leads to the design of equipment incorporating a combination of

- CREATIVE ENGINEERING
- DESIGN EXPERIENCE
- OPERATING BACKGROUND
- AMERICAN MANUFACTURING SKILL

which is nowhere else available and ready to answer your questions.

MANNESMANN-MEER

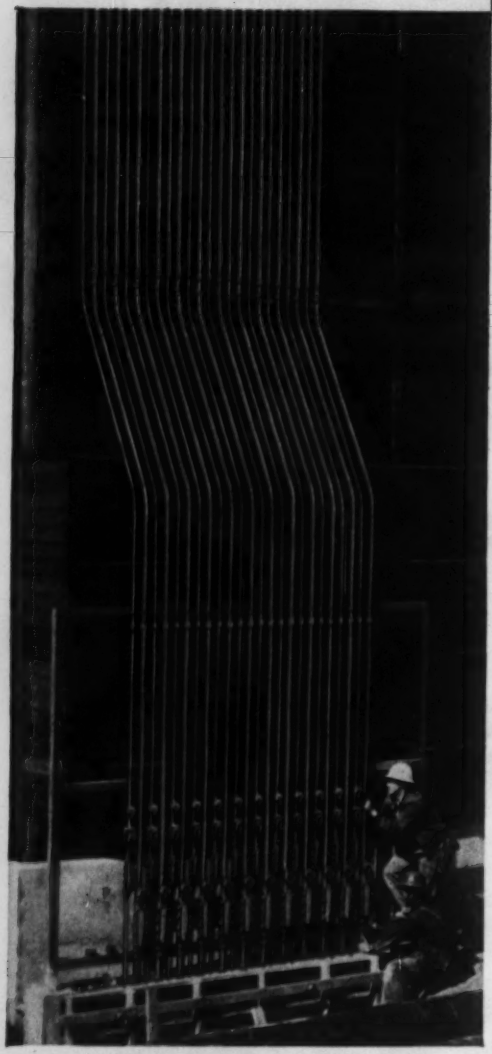
ENGINEERING AND CONSTRUCTION COMPANY, 900 LINE STREET, EASTON, PENNA

WORLD SPECIALISTS IN HIGH-SPEED TUBE MILL MACHINERY

DOWN a humid 180 feet below water level at Downsville Dam

Some 3600 feet of 2" Everdur Conduit (E.M.T.) protect electric lines in a service shaft plunging down to the release water chamber 180 feet below water level at Downsville Dam of the New York Metropolitan Water Supply System. Electric lines operate vital valves, indicating and communication equipment.

UP in the corrosive air at a water cooling tower



During the War, General Petroleum Corp. saw galvanized conduit fail within a year at one of its plants—replaced it with Everdur Conduit. At its new Ferndale Mobilgas Refinery in Washington, some 12,000 pounds of Everdur Conduit in various sizes guard electric power lines for motors and lighting in this water cooling tower.

EVERDUR Conduit will guard the electric power lines—for years

Everdur* Never Rusts. It offers high resistance to other types of corrosion. That's why Everdur Conduit—made from one of Anaconda's exclusive copper-silicon alloys—is specified for dependable year-after-year protection of electric power lines in industry, on bridges, at power and water supply projects—wherever water and corrosive atmospheres are a problem—or where conduit must be buried or embedded in concrete.

Everdur is Tough. In addition to corrosion resistance, Everdur has high physical strength, resists wear and abrasion. It stands up under movement and vibration, as on a bridge, in a subway, in a factory.

Everdur is Nonmagnetic. Everdur Conduit creates no magnetic field to produce temperature rise in electric power cables.

Everdur Electrical Conduit is available in two wall thicknesses —R.C. in nominal sizes from ¼" to 4", inclusive, and E.M.T. in nominal sizes ⅜" to 2", inclusive. For more detailed information write: The American Brass Company, Buffalo Division, Buffalo 5, N. Y. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

55120

*Reg. U. S. Pat. Off.

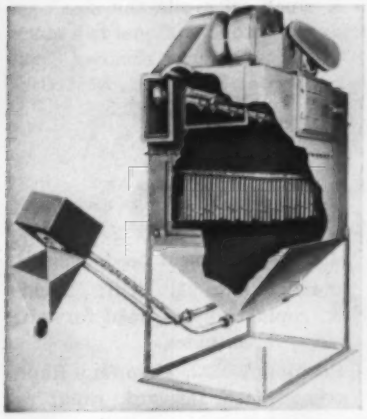
EVERDUR ELECTRICAL CONDUIT

ANACONDA®

COPPER SILICON ALLOYS

CORROSION RESISTANT • STRONG • NONMAGNETIC • WORKABLE • WELDABLE

NEW PRODUCTS and equipment



or intermittently by manual, hydraulic or mechanical means.

Dust-laden gases can be wetted and cooled in the entry chamber. Flushing prevents build-up of solids on the inside. *Write*: Johnson-March Corp., Philadelphia, Pa. *Phone*: Regent 9-3389

Press Brake Control

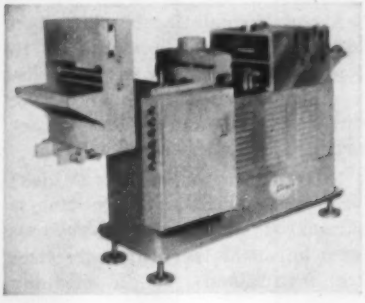
Electronic controls (they can be installed on any press brake) make for faster and safer operation. They have four parts: 1. A limit switch box tied in with the stroke of the ram. 2. A solenoid. 3. A foot switch or hand button. 4. A control panel.

Features include a preset stop, a self-return and a nonrepeat.

Kinking and whipping of even the largest sheets are eliminated. *Write*: American Actuator Corp., 219 E. 44th St., New York 17, N. Y. *Phone*: Oxford 7-2989

Gripper Feed Unit

Stock can be fed into a press from any direction by the self-contained feed unit. It feeds stock of any width up to 20 in. It can



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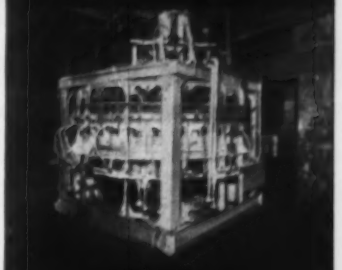
for military production . . .

Continental Automatic Strip Production Line consisting of annealer, pickling machine, dryer, and coiler

Continental Special Automatic Pig Molding Machine complete with automatic charging, melting and pouring

Continental Automatic Production Line operating from raw materials to completely finished and packed product. This production line consists of fifteen integrated, synchronized, special automatic machines



Continental Special Automatic Glazing Machine complete with automatic press, synchronizer and fire polisher

For maximum production of military items manual operations must be eliminated. With CONTINENTAL Special Automatic Machines and Integrated Production Lines production goes on in a continuous flow with better, more uniform products with a minimum of man hours.

CONTINENTAL jobs begin with analysis of the requirements, then the selection and development of proper methods for greatest results. Finally follows the design, the building, and the installation of the machines—delivering a COMPLETE UNITIZED PRODUCING PACKAGE with results guaranteed.

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FURNACES
PRODUCTION LINES
CONTINENTAL
SPECIAL MACHINES
COMPLETE PLANTS

MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

be designed to feed up to 48 in.

Stock feeds are within 0.003 in. of the selected setting. The unit is timed by the stroke of the press ram.

The unit comes equipped with a front stock guide and a rear stock assembly, a scuff-free gripper assembly, a stock retainer, a motor and pump assembly, four adjustable legs and a conveniently positioned control panel.

The front stock guide keeps stock at the proper level and in line for the desired positioning in the press die. Adjustable stock guide rolls make it easy to run various stock widths.

The rear stock guide assembly adjusts to handle stock from ½ to 48 in. A hand knob at the end of the cylinder adjusts the feed length.

The gripper assembly has special gripper pads that feed stock without scratching or scuffing.

An opposed-roller stock retainer prevents stock from slipping backward on the return stroke of the gripper.

A stock oiler oils the stock on top and bottom. Optional is a stock straightener that removes coil bend. *Write*: Sesco Inc., 8881 Central Ave., Detroit 4, Mich.

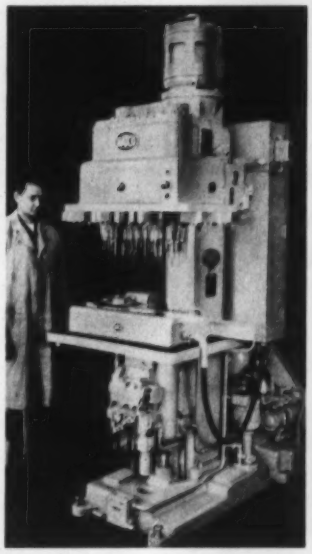
Drilling Machine

This unit drills, chamfers and taps holes automatically.

Here is a typical feed cycle:

Position No. 1, drill: Locate part, rapid traverse, feed forward, rapid reverse, index.

Position No. 2, chamfer: Rapid traverse, feed forward, rapid reverse, index.



Position No. 3, tap: Rapid reverse, feed forward, feed reverse, rapid reverse, index to position No. 1.

The machine has a three-position automatic fixture slide. *Write*: National Automatic Tool Co., Richmond, Ind. *Phone*: 2-1183

Cold Setting Core Binder

A new formulation of oils, when added to sands in amounts up to 2 per cent, produces hard, nondeforming, finished cores and mold surfaces. The sand-binder mixture is poured into the corebox.

No ramming of sand is needed; 50 to 60 per cent of the rodding is eliminated; core surfaces have uniform hardness; accurate core sizes are maintained; rough cleaning

SPECIFICALLY ENGINEERED . . . NEVER MERELY ADAPTED . . . FOR EACH PARTICULAR TYPE OF APPLICATION

HANSEN QUICK-CONNECTIVE COUPLINGS

ONE-WAY SHUT-OFF
Shuts off one side of line

Gives quick connection and disconnection, with instant automatic flow or shut-off. To connect Coupling, and open line to flow of fluid, merely push Plug into Socket. To disconnect, a slight pull on sleeve releases Plug and shuts off supply end of line.

TWO-WAY SHUT-OFF
Shuts off both sides of line

To connect, pull back sleeve and push Plug into Socket. Identical torpedo type valves permit free flow of gas or liquid through Coupling. To disconnect, pull back sleeve . . . Coupling immediately disconnects, valves automatically seal both ends of line. Female pipe thread connections from ⅛" to 1". Available in brass or steel.

STRAIGHT-THROUGH COUPLING

Provides quick connection and disconnection, but does not have shut-off feature. Sizes, ranging from ¼" to 2½", carried in stock. Two special types of straight-through steam Couplings also available—one for low pressures, and one for high pressures.

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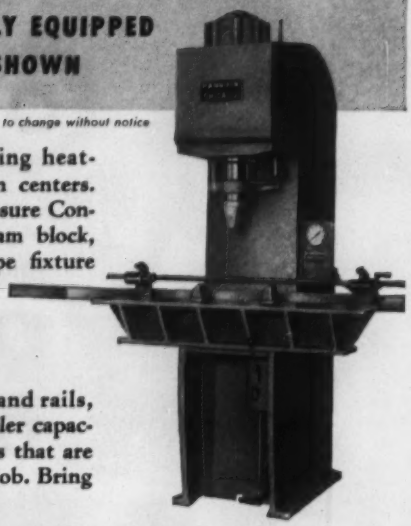
$4,179 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice



The ideal press for straightening heat-treated parts up to 60" between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

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Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)—all at prices that are easily justified by savings on the job. Bring us your straightening problems.

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HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

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This die head is unique

THERE IS NO OTHER LIKE IT

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: *their cost is so low they can be even thrown away when dull.* For example, for less than $40 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve.
"Unified and American Screw Thread Digest," sent free on request.

THE EASTERN MACHINE SCREW CORPORATION 22-42 Barclay St., New Haven, Conn.

NEW PRODUCTS and equipment

time is eliminated; sand life is controlled; and sand handling is simplified. *Write*: G. E. Smith Inc., 246-C, Washington Rd., Pittsburgh 16, Pa. *Phone*: Locust 1-2962

Cutoff Wheel

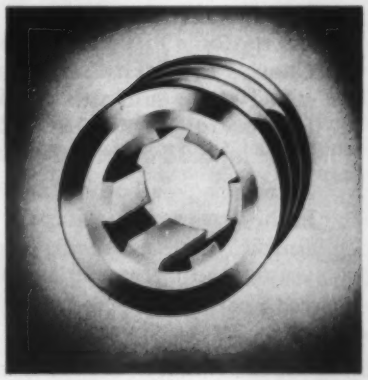
Faster cutting in foundry applications is the claim made for this wheel. New bonds and bonding processes permit an increase in abrasive grain content and allow grains to be bonded in a porous construction.

Rough abrasive sides provide clearance to maintain wheel speed at best operating efficiency.

Reinforcing layers give the high tensile strength needed for rugged use. *Write*: Bay State Abrasive Products Co., Westboro, Mass. *Phone*: Westboro 433

Full Socket Setscrew

A new setscrew has a socket that extends the full length of the screw. Wire sizes range from No. 4



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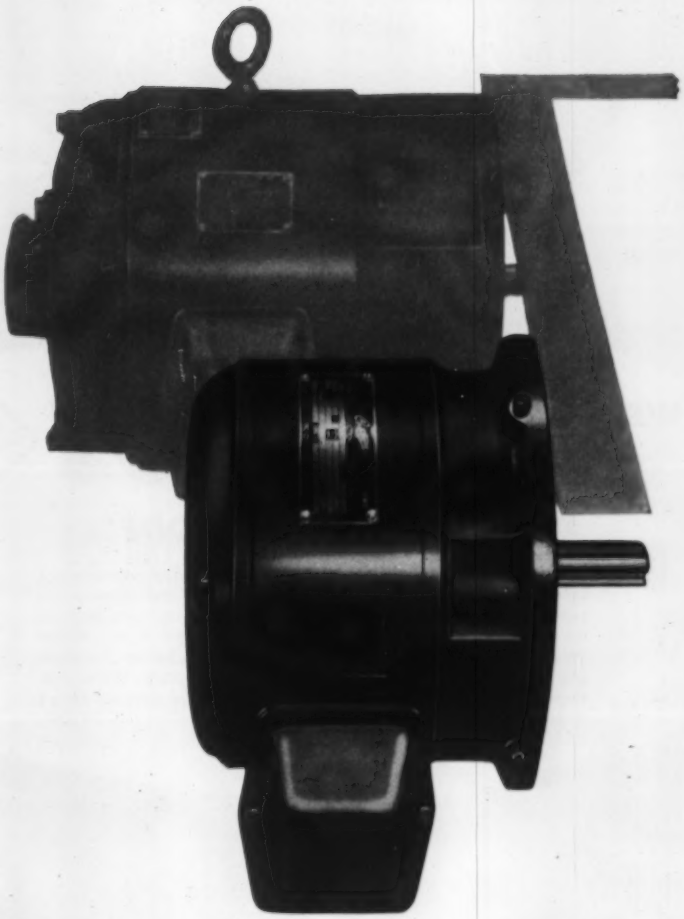
This new line of shorter, round-frame, end-mounted motors by Century can give you greater freedom in design and engineering. They meet modern demands for compactness and weight-saving ... with even better performance.

No special mountings are required! These shorter Century motors have full-size NEMA "D" flanges. They are interchangeable with all other popular makes of standard end-mounted motors. The shorter motors are available in sizes from 1 to 15 H.P... in open or totally enclosed fan-cooled frames . . . for vertical or horizontal applications.

For full data, call your nearest Century Sales Office.



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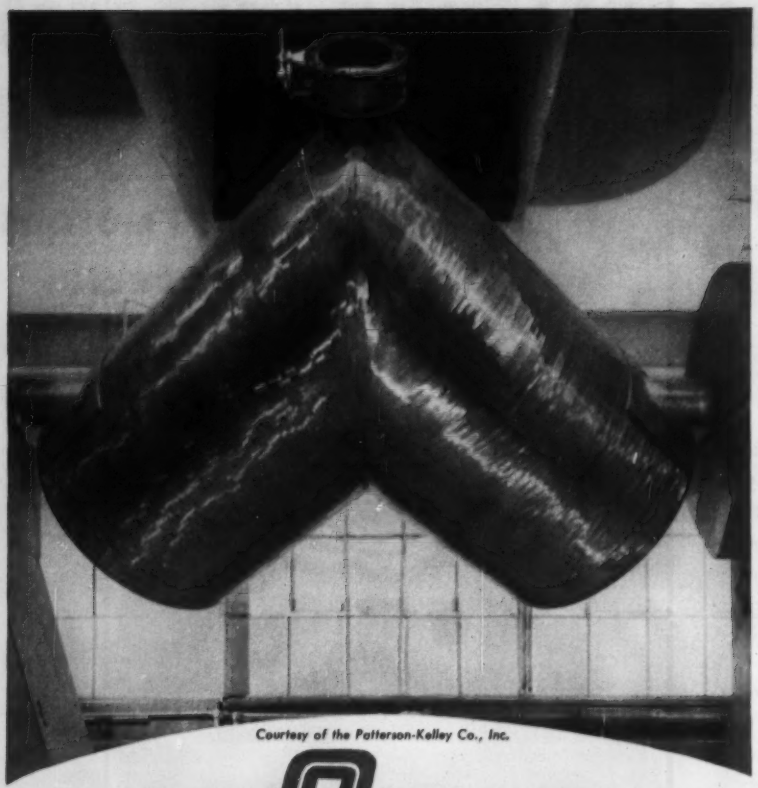

Courtesy of the Patterson-Kelley Co., Inc.

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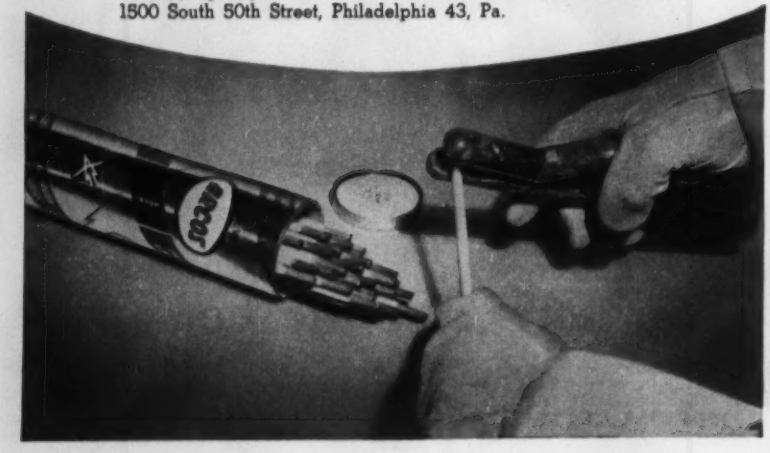
STAINLESS ELECTRODES

This precision blender is used for uniform mixing of vitamins and potent drugs with inactive materials. The same high standard of performance is provided by the Arcos Electrodes used to weld the twin-cones. They provide smooth unbroken joints whose uniform *stainless* and sound mechanical properties are the result of conscientious quality control in their manufacture. When you want stainless welds with properties equal to the material being welded, specify Arcos Electrodes. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



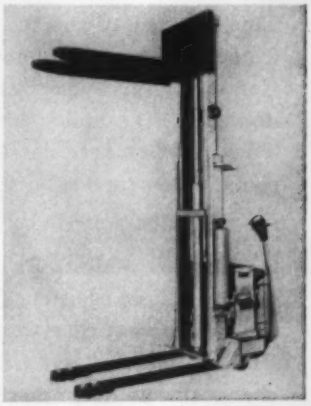
NEW PRODUCTS and equipment

to 1 in. in diameter. Hexagonal or multiple spline sockets are available.

The through-broached socket allows the screw to be wrenched from either end. Holding power equals that of conventional socket setscrews. *Write*: Socket Screw Division, Bristol Co., Waterbury 20, Conn. *Phone*: Plaza 6-4451

High-Lift Pallet Truck

This nesting fork truck is available in 2000, 3000 and 4000 lb capacities. Lifts go up to 130 in.



The truck has roller-type masts and a low-pressure hydraulic system. Its low-amperage draw gives longer battery life. *Write*: Lift Trucks Inc., Cincinnati 14, O. *Phone*: Main 1-4054

Welding Rod and Wire

Braze-welding of 16 and 18-gage mild steel by the metal-arc process is speeded by Ampco-Trode 10 electrodes (diameter, 5/64-in.). They give exceptional arc action, leave practically no spatter to clean, have good penetration, provide strong joints and excellent appearance.

Phos-Trode wire is available in 0.045, 1/16, 5/64 and 3/32-in. diameters. It contains 8 per cent tin and is recommended for many bearing and corrosion-resistant applications. It's also used for joining copper, tin bronzes, brasses, galvanized iron, cast iron and dissimilar metals. *Write*: Ampco Metal Inc., 1745 S. 38th St., Milwaukee 46, Wis. *Phone*: Mitchell 5-3750

NEW literature

Write directly to the company for a copy

Fastener Catalog

All types of stainless steel fasteners are covered. Specifications and corrosion tables are included—catalog 55A, 24 pages. Star Stainless Screw Co., 655 Union Blvd., Paterson 2, N. J.

Fork Lift Truck

Advantages and specifications of a 5000-lb capacity truck are given—4 pages. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, O.

Can Machinery

A complete line of flanging, beading and thread rolling machinery for medium and high-speed canmaking is described—catalog 36B section 4, 20 pages. E. W. Bliss Co., 50 Church St., New York 7, N. Y.

Gamma Ray Projector

Radioactivity is discussed and the advantages of a portable gamma ray unit are given—24 pages. Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.

Surface Grinders

Described are two, high-production, automatic rotary machines—bulletin 147-2, 12 pages. Mattison Machine Works, Rockford, Ill.

Hydraulic Tables

This reference work is for engineers interested in pumping and piping problems—bulletin 50, 28 pages. Aldrich Pump Co., 25 Pine St., Allentown, Pa.

Power Positioners

Performance and construction specifications are given for pneumatic positioners used to control flow, pressure or temperature by operating valves, gates or dampeners—bulletin TP-MFI, 20 pages. Hagan Corp., 323 Fourth Ave., Pittsburgh, Pa.

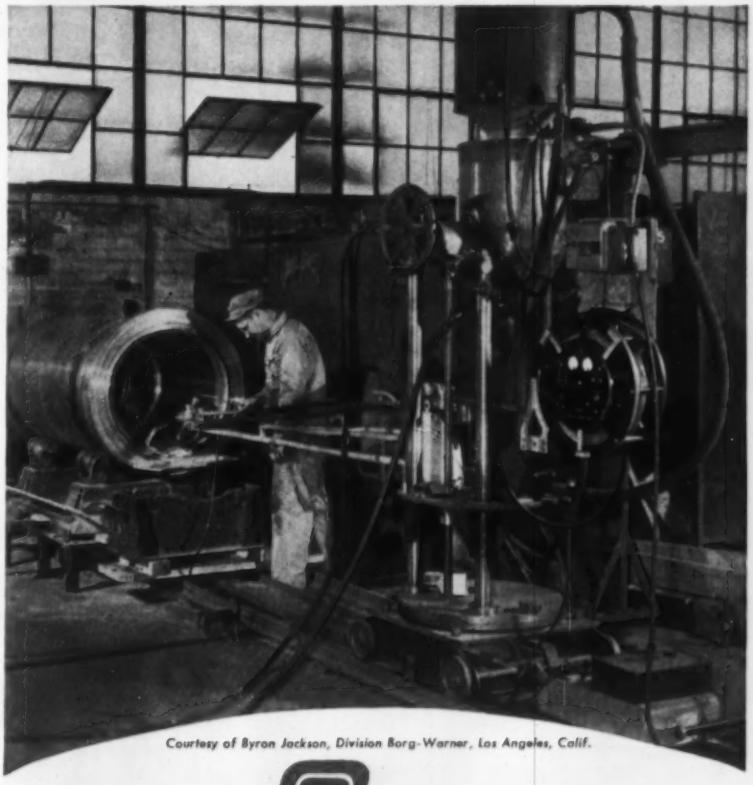
Strip Coil Annealing

Described are installations for the high convection annealing of strip steel coils—bulletin LW-855, 8 pages. Lee Wilson Engineering Co. Inc., 20005 W. Lake, Cleveland, O.

Multiple-Way Machine Tools

Described are automatic machines built to meet specific production needs of drilling, reaming, tapping,

How to *guarantee* yourself the positive benefits of submerged arc welding

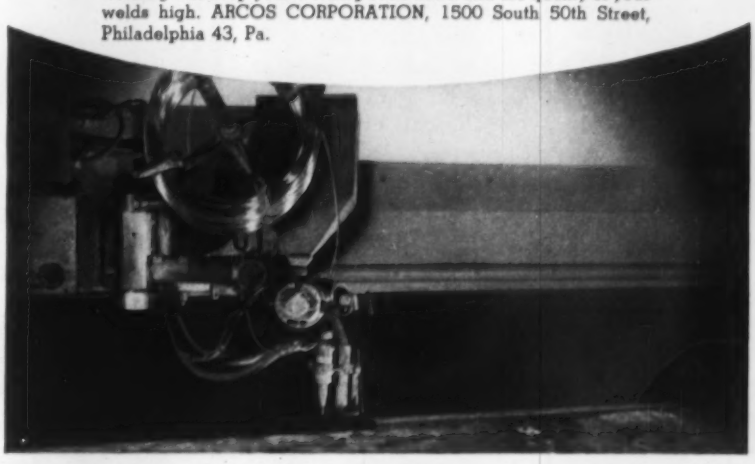


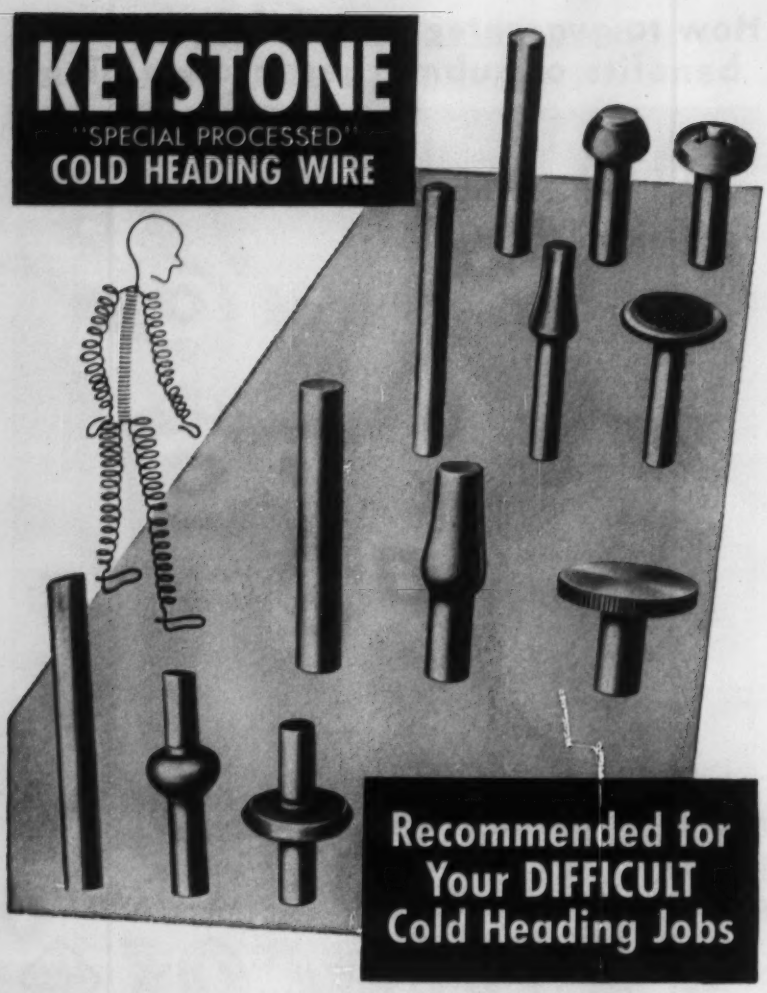
Courtesy of Byron Jackson, Division Borg-Warner, Los Angeles, Calif.

WELD WITH ARCOS

STAINLESS WELDING RODS

To save time and money, submerged arc welding was used to overlay type 308 stainless weld metal on the inside of this barrel of a boiler pump. Arcos Chromar Coiled Wire helped guarantee these savings through fast, easy deposition with minimum dilution. On your own jobs, Chromar Coiled Wire . . . *quality controlled* . . . teamed with the time-saving advantages of submerged arc welding will keep your welding costs down and the quality of your welds high. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.





When you have "tough-to-make" cold heading jobs on your production schedule, it will pay you to consider the outstanding advantages offered by Keystone "Special Processed" Wire.

The superior grain flow characteristics of this wire provides the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the most difficult cold heading process. The structural soundness and uniformity of "Special Processed" Wire further proves itself through trouble-free machine operation, longer die life, and finished products of the highest quality.

If you have a special wire problem . . . large or small . . . let us help you solve it. Contact your Keystone representative or write.

NEW LITERATURE

facing and milling—8 pages. Dept. M-W, W. F. & John Barnes Co., 301 S. Water St., Rockford, Ill.

Industrial Cleaning

Here is information to help you find the proper method, machine and material for cleaning, decarbonizing, bonderizing, stripping, blackening, pickling and processing of metal parts—bulletin 10,000-G, 34 pages. Dept. S, Equipment Division, Magnus Chemical Co. Inc., Garwood, N. J.

Clay Guns

Clay pressure up to 600 psi is provided by guns for plugging tapping holes of blast furnaces and large electrical furnaces—4 pages. William M. Bailey Co., 1221 Banksville Rd., Pittsburgh, Pa.

Pneumatic Regulators

Filters, regulators, relays, purge assemblies and control panels are described—bulletin H-2, 8 pages. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

Vibration Control

Spring and pad mountings for vibration control are illustrated in typical installations—catalog G-55, 8 pages. Vibration Mountings Inc., 76-17 Queens Blvd., Elmhurst, N. Y.

Ferrous Chart

Represented are the chief characteristics of steel up to 2900° F. Tempil° Corp., 132 W. 22nd St., New York 11, N. Y.

Pivoted Hook Carrier

Here is information on a 20,000-lb capacity carrier—4 pages. Ross Carrier Division, Clark Equipment Co., Benton Harbor, Mich.

NEW BOOKS

Lessons in Arc Welding, Hobart Trade School Inc., Hobart Square, Troy, O. 200 pages, $1.
A series of practical exercises and instructions for developing and improving the technique of arc welders includes information of value to those designing parts for fabrication.

Principles of Metal Casting, Richard W. Heine and Philip C. Rosenthal, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. 639 pages, $7.50.
A comprehensive treatment of metal casting that covers molding and metallurgical processes.

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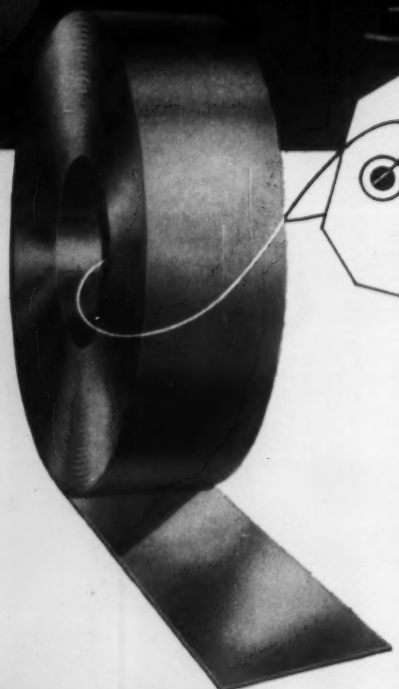
Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



Rigid quality control through every phase of production at Follansbee produces a finish that has earned the reputation of the finest in the industry. Follansbee mill operators take pride not only in meeting your exact specifications but also in giving you cold rolled strip that has consistent uniformity.

Get in touch with your Follansbee representative before you place your next order for strip. He's anxious to show you what true quality and unmatched service can do for you and your product.

FOLLANSBEE

STEEL CORPORATION

FOLLANSBEE, WEST VIRGINIA

Cold Rolled Strip • Terne Roll Roofing • Polished Blue Sheets and Coils

Sales Offices in Principal Cities

Market Outlook

TIGHT steel supply right through the first half of 1956 appears increasingly certain.

Heavy carry-over tonnage, indicated for the year end in all the major products, will take up a substantial part of first quarter output—four to six weeks of production, at least. This means considerable business will be shoved into second quarter schedules, resulting in a much heavier mill order load during that period.

BULLISH VIEW—Commenting on the 1956 outlook, Bay Estes, commercial research director, U. S. Steel Corp., says: "The general accumulation of inventory, which began in first quarter of 1955, is expected to continue at a substantial level through midyear of 1956 and taper off in the last half of the year."

He predicts a decline in automobile production next year to a possible 7 million units. Expected declines in residential construction will be offset by increases in other classes of building.

CONSOLATION—For what consolation it may afford steel buyers, supply conditions in the first and second quarters next year promise to be no worse than they are now. With most producers, they should be much better than they were in the third quarter this year.

During the third quarter, mills were heavily oversold because expected cutbacks in automotive requirements failed to materialize. As far back as late first quarter, producers began booking extra tonnage as insurance against a summer lull in automobiles and a lag in demand attending vacations and hot weather. As things turned out, there was scarcely any letdown in demand for any reason. Mills have been trying to dig themselves out ever since—a job made difficult by uninterrupted high demand.

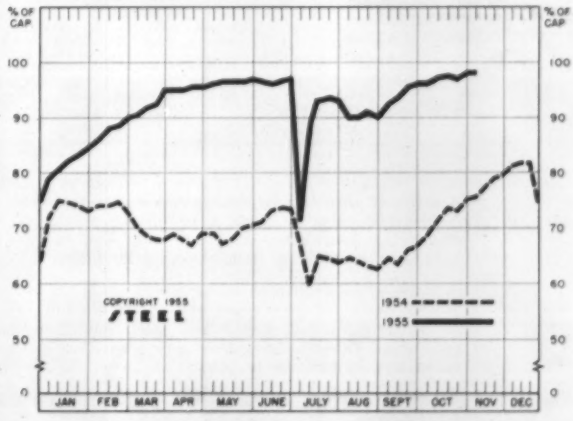
STILL OVERLOADED—Mills still have a long way to go before demand and supply are brought into balance. This is true not only of sheets but also of bars and in varying degrees of other steel products. Automotive requirements are reflected in continued strong demand for sheets and bars. Heavy demand for plates and shapes is due to a constant building up of needs in construction and equipment industries.

TO FARE BETTER—In plates, any slackening that might have been experienced the last several months would have been more than offset by the sudden sharp expansion in the railroad equipment program. Carbuilders have not been able to get anything like the tonnage they would like for the reason they were late in placing orders with the mills. They will fare better in first half of next year.

PRICES—Except for a revision in size extras on hot-rolled carbon steel wire rods in sizes 35/64-in. and smaller (announced by operating divisions of U. S. Steel Corp.), prices are firm. This change resulted in increases of $1 to $4 per ton. STEEL's arithmetical price composite on steelmaking grades of scrap advanced 17 cents last week to $45.17.

PRODUCTION—The steel mills have been producing at an all-time record rate, operating at 100 per cent of capacity and producing 2,413,000 net tons of ingots in the week ended Oct. 30, according to the American Iron & Steel Institute. Last week STEEL estimated the national ingot rate at 98 per cent of capacity.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 6	Change	Same Week 1954	Same Week 1953
Pittsburgh	103	— 1*	73.5	93
Chicago	98.5	0	79	100.5
Mid-Atlantic	97.5	— 0.5	70	96
Youngstown	97	— 3	74	97
Wheeling	98.5	— 1.5	81	98
Cleveland	101	— 2.5*	87	100.5
Buffalo	105	0	90	106.5
Birmingham	94	0	64	96.5
New England	91	+ 1	59	80
Cincinnati	90	0	76.5	67
St. Louis	106	+ 9	91	89.5
Detroit	97	— 3.5	80	97.5
Western	98	+ 7	86	104
National Rate	98	0	75.5	93.5

INGOT PRODUCTION‡

	Week Ended Nov. 6	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	147.4†	150.2	145.3	113.4
NET TONS (In thousands)	2,368†	2,413	2,334	1,822

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 81

Technical Outlook—p. 129

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 1 1955	Oct. 25 1955	Month Ago	Oct. Average
(1947-1949=100)	154.5	154.5	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 1

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.206
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R. Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R. Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 2 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	157.76
Index in cents per lb	5.659	5.659	5.659	5.270	4.274

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$95.09
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.64	49.35
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	48.28
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	49.63
Steelmaking Scrap, GT	45.17	45.00	45.33	33.67	41.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 2 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.80	4.80	4.50	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.80	4.80	4.50	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detriot	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50-3.75
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.15-4.85
Strip, C.R., Chicago	6.35	6.35	6.35	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50-4.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30-5.60
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.05	$9.05	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, 7/32-5/8" Pitts.	5.025	5.025	5.025	4.675	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$48.50
Basic, Valley	58.50	58.50	58.50	56.00	49.00
Basic, deld. Phila.	62.16	62.16	59.16	59.66	50.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, deld. Phila.	62.66	62.66	59.66	59.16	53.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	45.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	52.58
Malleable, Valley	59.00	59.00	59.00	56.50	49.50
Malleable, Chicago	59.00	59.00	59.00	56.50	48.00
Ferromanganese, Duquesne.	190.00†	190.00†	190.00†	190.00†	175.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.50	$44.50	$43.50	$34.50	$44.00
No. 1 Heavy Melt, E. Pa.	46.50	46.50	46.50	33.50	41.00
No. 1 Heavy Melt, Chicago	44.50	44.00	45.00	33.00	40.00
No. 1 Heavy Melt, Valley	48.00	48.00	46.50	35.50	43.75
No. 1 Heavy Melt, Cleve.	45.50	45.50	44.00	33.50	43.25
No. 1 Heavy Melt, Buffalo	43.50	38.50	38.50	30.50	41.50
Rails, Rerolling, Chicago	65.50	65.50	64.50	54.50	64.50
No. 1 Cast, Chicago	47.50	47.50	46.50	39.50	53.50
COKE, Net Ton					
Beehive, Furn, Connisvl.	$13.625	$13.625	$13.625	$13.75	$14.25
Beehive, Fdry, Connisvl.	16.50	16.50	16.50	16.75	16.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Price Nov. 2	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1954 Avg.
Copper	43.00-45.00	Oct. 7, 1955	43.00-50.00	44.594	45.380	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	14.920	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.020	12.940	11.500
Tin	96.75	Nov. 2, 1955	97.00	96.230	96.565	91.196
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld, New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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*Copyrighted trade name

Nonferrous Metals

Despite metal shortages and labor difficulties, nonferrous companies have chalked up a record nine months in sales and profits. Fourth quarter outlook is even brighter

Nonferrous Metal Prices, Pages 188 & 189

SALES AND PROFITS of the nonferrous industries for the first nine months of 1955 are running 25.4 per cent and 52.9 per cent, respectively, ahead of the same period last year. Prospects for the fourth quarter are brighter than ever.

Of the companies whose third-quarter reports are available, only one showed a decline in its profits in the 1955 period. Bridgeport Brass Co. reported a decline from $3,753,411 last year to $3,462,150 this year because of the heavy expenses involved in starting up the company's aluminum facilities in Adrian, Mich., earlier in the year. However, that facility is beginning to pay its own way, and third-quarter profits showed an increase over third quarter, 1954. Two other companies showed good profits for the first nine months after suffering losses in the first three quarters last year.

Scarcities Hurt—Despite the shortage of various metals, especially acute during the third quarter, most fabricators showed moderate to large gains in both sales and profits. Basic metal producers showed even larger percentage gains, largely because of the higher prices prevailing since midyear. Generally, prices are expected to remain high through the fourth quarter at least. In addition, supply of some of the scarcer metals, such as copper and nickel, is expected to improve because of greater production, or government stockpile diversions, or both.

Titanium Sponge Price Down

The price of titanium metal sponge has been reduced for the fourth time in less than two years. Grade A-1 sponge is now $3.75 a pound, compared with $5 a pound in March, 1954. This is a decline of 20 cents a pound from the previous price, effective Nov. 1. Grade A-2 was reduced from $3.50 to $3.25 a pound; grade A-2 fines from $3 to $2.75 a pound.

Dr. J. B. Sutton, specialty products sales manager for the pigment department of E. I. du Pont de Nemours & Co. Inc., said: "Improvements in manufacturing processes and the broadening of commercial markets should cause this trend to continue." He also said that the ductility and workability of grade A-1 sponge has been improved.

Magnesium Outlook Brightens

Based on an exhaustive test run in its new supersonic ramjet engine, Marquardt Aircraft Co. believes magnesium alloy HK31 (3 per cent thorium and 0.75 per cent zirconium) is in for greatly expanded use in the missile and engine field. That's what Alan V. Levy, superviser of materials and process section of Marquardt, told the 11th annual convention of the Magnesium Association.

STEEL's Metal Price Averages for Oct., 1955
(Cents per lb)

Electrolytic Copper, deld. Connecticut	44.594
Lead, St. Louis	15.300
Prime Western Zinc, E. St. Louis, Ill.	13.020
Straits Tin, New York	96.230
Primary Aluminum Ingots, deld.	24.400
Magnesium, Freeport, Tex.	32.500
Nickel, f.o.b. refinery	64.500

Using HK31, Marquardt fabricated the diffuser and forward aerodynamic section of an advanced ramjet engine which has to operate at temperatures in excess of 600° F. The engine requirements called for the use of sheet and casting applications, fusion welding, protective coating, joining and all the common types of fabrication used in aircraft construction, with the exception of resistance welding and complex formed surfaces. Mr. Levy reported: "We feel that the material has behaved well, considering its state of development."

The convention also got some inside information on the use of magnesium in the German Volkswagen auto. Both the American magnesium and auto industries have been watching the development for several years. The magnesium people see it as a new tonnage market for their product. The automakers see it as a means of cutting weight and costs.

Ludwig C. Boehner, chief engineer of Volkswagenwerk, told the meeting that the use of magnesium has "contributed to the successful production of our light and economical car." By using 36 lb of magnesium casting in the engine, clutch and transmission housing, about 110 lb have been saved in the over-all weight of the car.

More Aluminum Postponements

International complications are further clouding up the domestic aluminum picture. Arthur Flemming, director of the Office of Defense Mobilization, originally ordered delivery of 50 million lb of aluminum to the government. About 28 million lb were to be for the stockpile, while 22 million lb were to help relieve the metal shortage in Great Britain. Aluminum Co. of America and Kaiser Aluminum & Chemical Corp. were to forgive shipments due from Aluminium Ltd., so that Aluminium, in turn, could ship the metal to England.

The only hitch is that Alcoa and Kaiser haven't been getting enough metal from Canada to make up 22 million lb in the fourth quarter. Power failures and drouth have reduced that country's production. So it looks like Mr. Flemming will postpone the payment of this metal until the spring, when aluminum production is normally higher.

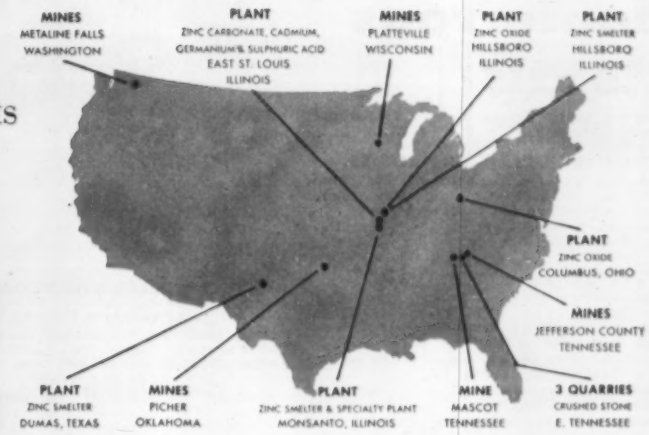
The aluminum industry also has asked ODM to forgive shipments of the light metal to the stockpile in the first quarter of 1956. Because it looks like the present shortage will go right on into next year, the request will probably be granted.

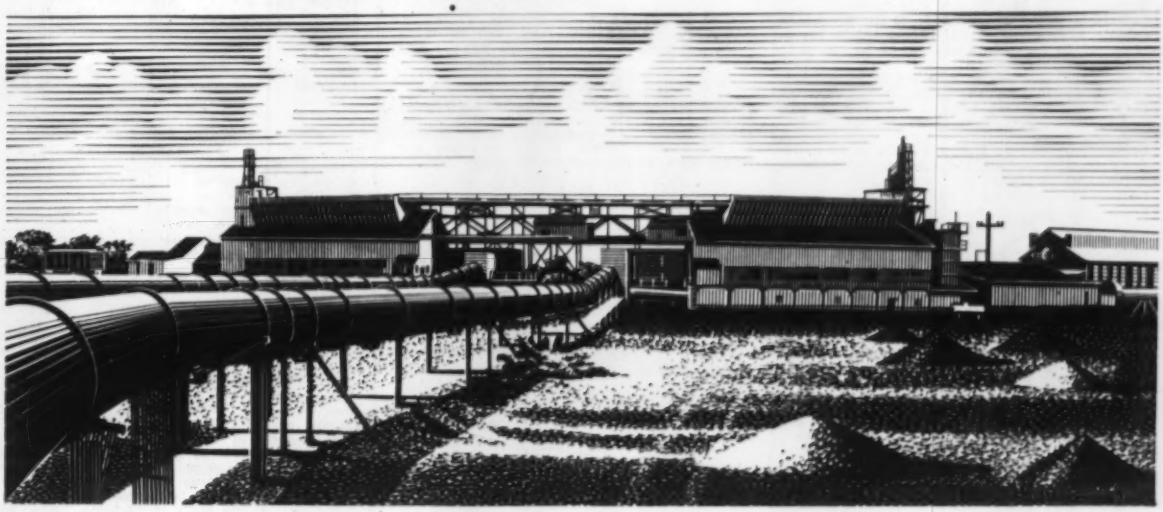
Nickel Doles Continue

The Office of Defense Mobilization has announced another "gift" from the stockpile for nickel users. But this one is really going to cost consumers. For both November and December, 1.1 million lb of ferronickel and nickel ingot will be released in addition to the 3 million lb a month previously announced. This $1-a-pound variety of the metal is all that's left for the government to give out. A total of nearly 24 million lb of the scarce metal have been diverted from stockpile delivery since Mar. 1, or about 10 per cent of the total supply.

American Zinc and its products

from A *to* Z





DUAL OPERATION AT HILLSBORO, ILLINOIS

(1) The Oxide Division supplies American process lead-free and leaded zinc oxide, as well as French process zinc oxide. (2) In the Metal Division, Prime Western, Select, Brass Special, Intermediate and High Grade slab zinc are produced. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.2; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 45.00 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99% +, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $278-$283 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "P" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $91-$102 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 91.625 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 97.00; prompt, 96.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.75, grade A-2 (0.5% Fe max), $3.25 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.50-14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.50-33.50; No. 12 foundry alloy (No. 2 grade) 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.75; 13 alloy, 0.60 Cu max, 32.00-32.75; 195 alloy, 32.00-32.75; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.25-32.25; grade 2, 30.25-31.25; grade 3, 29.50-30.50; grade 4, 29.00-30.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l., 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam. 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate, 66.00c, 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ⅛-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.50; old sheets, 16.50-18.00; borings and turnings, 11.00-11.50; crankcases, 16.50-18.00; industrial castings, 16.50-18.00.

Copper and Brass: No. 1 heavy copper and wire, 35.00-36.00; No. 2 heavy copper and wire, 34.00-34.50; light copper, 31.50-32.50; No. 1 composition red brass, 28.00-29.00; No. 1 composition turnings, 26.00-28.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	62.76b	60.36c	....	62.82	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.750
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	66.33g	66.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.56	68.68e	37.625	37.375	36.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	25.750
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Brass turnings, 15.50-16.00; new brass clippings, 24.00-25.50; light brass, 15.50-17.50; heavy yellow brass, 17.50-20.00; new brass rod ends, 22.00-24.00; auto radiators, unsweated, 23.00-23.50; cocks and faucets, 21.00-23.50; brass pipe, 23.00-24.00.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-60.00; old sheets, 45.00-50.00; turnings, 44.00; rods, 54.50-60.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap; 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 22.50; 3003 clippings, 22.25-22.50; 6151 clippings, 22.00-22.50; 5052 clippings, 22.00-22.50; 2014 clippings, 21.50; 2017 clippings, 21.50; 2024 clippings, 21.50; mixed clippings, 21.50-22.00; old sheet, 19.00; old cast, 19.00-20.00; clean old cable (free of steel), 22.00-22.50; borings and turnings, 19.00-20.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 65.00; light scrap, 60.00; turnings and borings, 43.00-55.00.

Copper and Brass: No. 1 copper and wire, 39.00; No. 2 copper and wire, 37.50; light copper, 35.00-35.25; refinery brass (60% copper) per dry copper content, 35.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper and wire, 39.00; No. 2 copper and wire, 37.50; light copper, 35.00-35.25; No. 1 composition borings, 31.50; No. 1 composition solids, 32.00-32.50; heavy yellow brass solids 22.00; yellow brass turnings, 21.00; radiators, 24.50-25.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.42, oval, 58.92, 5000-10,000 lb; electrodeposited, 56.78, 2000-5000 lb lots; cast 62.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.155; 2000-499 lb, $1.14; 500-999 lb, $1.135; 1000 lb or more, $1.13.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 73.00; 100-600 lb, 58.6; 700-1900 lb, 56.1; 2000-9900 lb, 54.4; 10,000 lb or more, 53.2.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.594; 50 lb, $1.254; 100-300 lb, $1.104; 400-900 lb, $1.08; 1000-1900 lb, $1.055; 2000-4900 lb, $1.019; 5000-19,900 lb, 95.8; 20,000 lb or more, 89.7.

Stannous Sulphate: Less than 500 lb, $1.293; 50 lb, 99.30; 100-1900 lb, 97.30; 2000 lb or more, 95.3.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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1905-1955 50th ANNIVERSARY FISCHER SPECIAL MFG. CO. CINCINNATI, OHIO

Fischer

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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 191. Key to footnotes, Page 193.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)

Detroit R7 .....$69.00
Houston 85 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ...$68.50
Bessemer,Pa. U5 .....68.50
Bridgeport,Conn. N19,.73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 ...76.00
Gary,Ind. U5 .....68.50
Johnstown,Pa. B2 ...68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ...74.50
Munhall, Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S.Chicago,Ill. R2, U5..68.50
S.Duquesne,Pa. U5 ...68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ...$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana, Calif. K1 ...92.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houton 85 .....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2..84.50
LosAngeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ...84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 ...96.00
Conshohocken,Pa. A3..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ...115.00
Gary,Ind. U5 .....96.00
Houston 85 .....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP

Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 ..5.025
Aliquippa,Pa. J5 .....5.025
Alton,Ill. L1 .....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 .....5.025
Donora,Pa. A7 .....5.025
Fairfield,Ala. T2 .....5.025
Houston 85 .....5.275
IndianaHarbor,Ind. Y1.5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 .....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 ....5.125
LosAngeles B3 .....5.825
Minnequa,Colo. C10 ...5.275
Monessen,Pa. P7 .....5.025
N.Tonawanda,N.Y. B11.5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 .....5.025
Roebling,N.J. R5 .....5.125
S.Chicago,Ill. R2 .....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ...5.025
Sterling,Ill. N15 .....5.125
Struthers,O. Y1 .....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....4.60
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 .....5.25
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston 85 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 ....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 .....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes

Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....5.65
Houton 85 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S, L.A. Std. Shapes

Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston 85 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.75
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ...5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ...4.50
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GraniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 .....5.10
Houston 85 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ...4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.50
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 .....4.50
Youngstown R2, U5, Y1.4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....5.65
Fontana,Calif. K1 ....6.30
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 .5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1 .7.375
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston 85 .....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ....6.725
LosAngeles B3 .....7.625
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 ....6.30
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....6.30
Houston 85 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES

Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 ....5.575
Ind.Harbor,Ind. I-2 ....5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.65
Aliquippa,Pa. J5 .....4.65
Alton,Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer,Ala. T2 .....4.65
Birmingham C15 .....4.65
Bridgeport,Conn. N19 ..4.80
Buffalo R2 .....4.65
Canton,O. R2 .....4.75
Clairton,Pa. U5 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 .....4.65
Houston 85 .....4.90
Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
Los Angeles B3 .....5.35
Massillon,O. R2 .....4.75
Midland,Pa. C18 .....4.65
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.65
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 .....4.65
S.SanFran.,Calif. B3 ....5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 .....4.65
Weirton,W.Va. W6 .....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 .....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 .5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fontana,Calif. K1 .....6.625
FairlessHills,Pa. U5 ....5.725
Gary,Ind. U5 .....5.575
Houston 85 .....5.825
Ind.Harbor,Ind. I-2,Y1.5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago, R2, U5, W14.5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.80
Houston 85 .....7.05
Ind.Harb.,Ind. I-2, Y1 ..6.80
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....6.80
S.Duquesne,Pa. U5 .....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana,Calif. K1 .....5.35
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.65
Gary,Ind. U5 .....5.65
Houston 85 .....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 .....5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 .....8.50
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 ....8.50
SpringCity,Pa. K3 ....8.50
Warren,O. C17 .....8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.90
BeaverFalls,Pa. M12, R2 5.90
Buffalo B5 .....5.95
Camden,N.J. P13 .....6.35
Carnegie,Pa. C12 .....5.90
Chicago W18 .....5.90
Cleveland A7, C20 .....5.90
Detroit R7 .....5.90
Detroit B5, P17 .....6.10
Donora,Pa. A7 .....5.90
Elyria,O. W18 .....5.90
FranklinPark,Ill. N5 ...5.90
Gary,Ind. R2 .....5.90
GreenBay,Wis. F7 .....5.90
Hammond,Ind. L2, M13.5.90
Hartford,Conn. R2 ....6.40
Harvey,Ill. B5 .....5.90
LosAngeles R2, S30 ....7.35
Mansfield,Mass. B5 ....6.45
Massillon,O. R2, R8 ....5.90
Midland,Pa. C18 .....5.90
Monaca,Pa. S17 .....5.90
Newark,N.J. W18 .....6.35
NewCastle,Pa.(17) B4 ..5.90
Pittsburgh J5 .....5.90
Plymouth,Mich. P8 .....6.15
Putnam,Conn. W18 .....6.45
Readville,Mass. C14 ....6.45
S.Chicago,Ill. W14 ....5.90
SpringCity,Pa. K3 .....6.35
Struthers,O. Y1 .....5.90
Waukegan,Ill. A7 .....5.90
Worcester,Mass. W19 ...6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 ....5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.60
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 .....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis. F7 .....7.425
Hammond,Ind. L2, M13.7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5 ...7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P5 ...7.625
S.Chicago W14 .....7.425
SpringCity,Pa. K3 ....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.425
Waukegan,Ill. A7 ....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ....7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.65
Atlanta A11 .....4.85
Birmingham C15 .....4.65
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 ....5.35
Ft.Worth,Tex.(42) T4 ...5.10
Gary,Ind. U5 .....4.65
Houston 85 .....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. S5 .... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SandSprings,Okla. S5 .. 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFrancisco B3 .... 5.40
SparrowsPoint,Md. B2 .. 4.65
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 ... 6.45
Lackawanna,N.Y. B2 .. 6.17
Marion,O. P11 ..... 5.90
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ½-1" B2 .. 6.15
Williamsport,Pa. S19 .. 6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.25
ChicagoHts.(3) C2, I-2 .. 4.55
ChicagoHts.(4) C2, I-2 .. 4.65
Ft.Worth, Tex.(26) T4 .. 4.95
Franklin,Pa.(3) F5 .... 4.55
Franklin,Pa.(4) F5 .... 4.65
Marion,O. (3) P11 .... 4.50
Moline,Ill.(3) R2 ..... 4.65
Tonawanda(3) B12 .... 4.50
Tonawanda(4) B12 .... 4.65
Williamsport,Pa(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 ..... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .. 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 .... 4.325
FairlessHills,Pa. U5 .. 4.375
Fontana,Calif. K1 .... 5.075
Gary, Ind. U5 ..... 4.325
Geneva,Utah C11 .... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .... 4.425
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6, (37).. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .. 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11.. 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 .... 4.325
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2. 4.325
Steubenville,O. W10 .. 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .. 4.325
Youngstown U5, Y1 .. 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 .... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 .... 6.375
Ecorse,Mich. G5 ..... 6.475
Fairfield,Ala. T2 .... 6.375
FairlessHills,Pa. U5 .. 6.425
Fontana,Calif. K1 .... 7.125
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375
SparrowsPoint(36) B2. 6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 .... 6.375
Youngstown U5, Y1.... 6.375

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky. (8) A10 .. 4.575
Cleveland R2 ..... 4.925
Ind.Harbor,Ind. I-2 ... 4.575
Warren,O. R2 ..... 4.925

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 ..... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 .... 5.325
FairlessHills,Pa. U5 .. 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity,Ill. G4 .... 5.525
Ind.Harbor,Ind I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2. 5.325
Steubenville,O. W10 .... 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.875
Dravosburg,Pa. U5 .... 7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 .... 7.925
Fontana,Calif. K1 .... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1. 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.925
Middletown,O. A10 .... 5.825
Warren,O. R2 ..... 5.925

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.90	...
Canton,O.	R2 ... 6.10	6.55
Dravosburg	U5 .. 6.10	...
Fairfield	T2 ... 6.10	...
Gary,Ind.	U5 ... 6.10	6.35
Ind.Harbor	I-2 .. 6.10	6.35
Kokomo,Ind.	C16 6.20	...
MartinsFry.	W10 6.10	...
Newport,Ky.	N9 .. 6.10	6.35
Pitts.,Calif.	C11 .. 6.85	...
SparrowsPt.	B2 .. 6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 7.15
Gary,Ind. U5 ..... 6.35
MartinsFry,O. W10 .... 6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.85‡
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85‡
Delphos,O. N16 ..... 6.60‡
Dover,O. R1 ..... 5.85‡
Dravosburg,Pa. U5 ... 5.85†
Fairfield,Ala. T2 ..... 5.85‡
Gary,Ind. U5 ..... 5.85*
GraniteCity,Ill. G4 .... 6.05
Ind.Harbor,Ind. I-2 ... 5.85†
Kokomo,Ind. C16 ..... 5.95‡
MartinsFerry,O. W10 .. 5.85*
Middletown,O. A10 .... 5.85†
Newport,Ky. N9 ..... 5.85‡
Niles,O. N12 ..... 6.85‡
Pittsburg,Calif. C1 .... 6.60*
SparrowsPt.,Md. B2 .. 5.85†
Steubenville,O. W10 ... 5.85‡
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 .... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.60
SparrowsPoint(39) B2 .. 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 .... 6.25
Kokomo,Ind. C16 ..... 6.60
Newport,Ky. N9 ..... 6.25
Niles,O. N12 ..... 7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Canton,O. R2 ..... 6.60
Middletown,O. A10 .... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 .... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 .... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 .... 6.10
Ind.Harbor,Ind. I-2 .... 5.90
Middletown,O. A10 .... 5.90
Niles,O. N12 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 .... 7.75
Ind.Harbor,Ind. I-2 .... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 .... 6.25
Niles,O. N12 ..... 6.25
Weirton,W.Va. W6 .... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Division H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest SteelRoll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel &Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.325
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago, Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.525
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575
Warren,O. R2	4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland J5	6.25
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
Franklin Park,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.50
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.90
Pittsburgh J5	6.25
Portsmouth,O. P12	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y. (32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.25
Youngstown C8	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie, Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
New York W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	14.75	17.95	21.35

Ind.Harbor,Ind. Y1	9.30
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.10
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.55*
Youngstown C8	6.25*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	7.10*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	....	...	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-45	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55‡
Butler,Pa. A10	...	...	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg, Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.575	....	....
Niles,O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
FairlessHills,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70

MANUFACTURING TERNES (Light Coated 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	6.35
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	6.45
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	6.25
Newark 6-8 ga. I-1	6.90
N. Tonawanda B11	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
S.Chicago,Ill. R2	6.25
S.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquinna,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P16	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt., Md. B2	10.80

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struther,O. Y1	10.55
Worcester,Mass. J1	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville, Ill. K4	14.15
Monessen, Pa. P16	14.20
Roebling, N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville, Ind. M8	9.00
Dover, O. G6	9.00
Fostoria, O. S1	9.00
FranklinPark, Ill. T6	9.10
Kokomo, Ind. C16	9.00
Massillon, O. R8	9.00
Milwaukee C23	9.20
Monessen, Pa. P16	9.00
Pawtucket, R.I. N8	9.30
Riverdale, Ill. A1	9.10
Rome, N.Y. R6	9.00
Trenton, N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity, Ala. R2	152
Aliquippa, Pa. J5	152
Atlanta A11	154
Bartonville, Ill. K4	154
Chicago, Ill. W13	152
Cleveland A9	157
Crawfordsville, Ind. M8	154
Donora, Pa. A7	152
Duluth, Minn. A7	152
Fairfield, Ala. T2	152
Galveston, Tex. D7	157
Houston, Tex. S5	157
Johnstown, Pa. B2	152
Joliet, Ill. A7	152
KansasCity, Mo. S5	157
Kokomo, Ind. C16	154
Minnequa, Colo. C10	157
Monessen, Pa. P7	152
Pittsburg, Calif. C11	171
Rankin, Pa. A7	152
S.Chicago, Ill. R2	152
SparrowsPt., Md. B2	154
Sterling, Ill. (1) N15	152
Worcester, Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken, Pa. A3	$9.05
Wheeling, W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa, Pa. J5	152
Atlanta A11	154
Bartonville, Ill. K4	154
Crawfordsville, Ind. M8	154
Donora, Pa. A7	152
Duluth, Minn. A7	152
Fairfield, Ala. T2	152
Johnstown, Pa. B2	152
Joliet, Ill. A7	152
Kokomo, Ind. C16	154
Minnequa, Colo. C10	157
Monessen, Pa. P7	152
Pittsburg, Calif. C11	171
Rankin, Pa. A2	152
SparrowsPt., Md. B2	154
Sterling, Ill. (1) N15	152
Worcester, Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity, Ala. R2	$9.35
Bartonville, Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville, Ind. M8	9.46
Donora, Pa. A7	9.35
Duluth, Minn. A7	9.35
Johnstown, Pa. B2	9.35
Joliet, Ill. A7	9.35
Kokomo, Ind. C16	9.45
LosAngeles B3	10.14
Minnequa, Colo. C10	9.60
Pittsburg, Calif. C11	10.43
S.Chicago, Ill. R2	9.35
SparrowsPt., Md. B2	9.45
Sterling, Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity, Ala. R2	$9.65
Bartonville, Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville, Ind. M8	9.75
Donora, Pa. A7	9.65
Duluth, Minn. A7	9.65
Johnstown, Pa. B3	9.65
Joliet, Ill. A7	9.65
Kokomo, Ind. C16	9.75
LosAngeles B3	10.45
Minnequa, Colo. C10	9.90
Pittsburg, Calif. C11	10.13
S.Chicago, Ill. R2	9.65
SparrowsPt., Md. B2	9.75
Sterling, Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity, Ala. R2	$9.70
Bartonville, Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville, Ind. M8	9.80
Donora, Pa. A7	9.70
Duluth, Minn. A7	9.70
Johnstown, Pa. B2	9.70
Joliet, Ill. A7	9.70
Kokomo, Ind. C16	9.80
LosAngeles B3	10.50
Minnequa, Colo. C10	9.95
Pittsburg, Calif. C11	10.50
S.Chicago, Ill. R2	9.70
SparrowsPt., Md. B2	9.80
Sterling, Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity, Ala. R2	175**
Aliquippa J5	172§
Atlanta A11	181
Bartonville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175†
Duluth, Minn. A7	175†
Fairfield, Ala. T2	175†
Houston, Tex. S5	180†
Johnstown, Pa. B2	179*
Joliet, Ill. A7	175††
KansasCity, Mo. S5	180†
Kokomo, Ind. C16	177†
Minnequa, Colo. C10	180**
Monessen, Pa. P7	179*
Pittsburg, Calif. C11	195†
Rankin, Pa. A7	175†
S.Chicago, Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint, Md. B2	181*
Sterling, Ill. (1) N15	179*

WOVEN Fence, 9-15 Ga. Col.

Ala. City, Ala. R2	162**
Ala. City, 17 ga. R2	241**
Ala. City, 18 ga. R2	251**
Aliq'ppa, Pa. 9-14½ga J5	165§
Atlanta A11	168
Bartonville, Ill K4	168
Crawfordsville, Ind. M8	168
Donora, Pa. A7	162†
Duluth, Minn. A7	162†
Fairfield, Ala T2	162†
Houston, Tex. S5	167†
Johnstown, Pa. (43) B2	166
Joliet, Ill. A7	162†
KansasCity, Mo. S5	167†
Kokomo, Ind. C16	164†
Minnequa, Colo. C10	167**
Monessen, Pa. 9 ga. P17	166*
Pittsburg, Calif. C11	185†
Rankin, Pa. A7	162†
S.Chicago, Ill. R2	162**
Sterling, Ill. (1) N15	166*

WIRE (16 Gage) Stone	An'ld Galv. Stone
Ala. City R2	14.50 16.05**
Bartonville K4	14.60 16.50
Buffalo W12	14.50
Cleveland A7	14.50
Crawf'dsville M8	14.60 16.50
Fostoria, O. S1	14.60 16.15†
Johnstown B2	14.15 16.40*
Kokomo C16	14.60 16.15†
Minnequa C10	14.75 16.45**
Palmer, Mass W12	14.50 16.05*
Pitts., Calif. C11	14.85 16.40†
S.Chicago R2	14.50 16.05**
SparrowsPt. B2	14.60 16.50*
Sterling (1) N15	14.50 16.45††
Waukegan A7	14.50 16.05†
Worcester A7	14.80

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala. City, Ala. R2	7.40 7.80**
Aliquippa J5	7.40 7.92§§
Atlanta A11	7.50 8.075
Bartonville (48) K4	7.50 8.075
Buffalo W12	7.40 8.80†
Cleveland A7	7.40
Crawfordsville M8	7.50 8.075
Donora, Pa. A7	7.40 7.80†
Duluth, Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston, Tex. S5	7.65 8.05†
Jacks'ville, Fla. M8	7.90 8.475
Johnstown B2 (48)	7.40 7.975*
Joliet, Ill. A7	7.40 7.80†
KansasCity, Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7 (48)	7.40 7.975*
Palmer, Mass. W12	7.70 8.10†
Pitts., Calif. C11	8.35 8.75†
Portsmouth, O. P12	7.40
Rankin A7	7.40 7.80†
S.Chicago R2	7.40 7.80**
S.SanFran. C10	8.35 8.75**
Spar'wsPt. B2 (48)	7.50 8.075*
Str'ling (1) (48)	N15 7.40 8.00††
Struthers, O (48)	Y1 7.40 7.90‡
Worcester, Mass. A7	7.70

*Based on 12.50c zinc; †5c zinc; ‡10c zinc; §Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop

	Col.
AlabamaCity, Ala. R2	173
Atlanta A11	175
Bartonville, Ill. K4	175
Crawfordsville, Ind. M8	175
Donora, Pa. A7	173
Duluth, Minn. A7	173
Fairfield, Ala. T2	173
Joliet, Ill. A7	173
Houston S5	178
KansasCity, Mo. S5	178
Kokomo, Ind. C16	175
Minnequa, Colo. C10	178
S.Chicago R2	173
S.SanFran., Calif. C10	197
SparrowsPoint, Md. B2	175
Sterling, Ill. (1) N15	173

FENCE POSTS

	Col.
ChicagoHts., Ill. C2, I-2	157
Duluth, Minn. A7	157
Franklin, Pa. F5	157
Huntington, W.Va. W7	157
Johnstown, Pa. B2	166
Marion, O. P11	157
Minnequa, Colo. C10	162
Moline Ill. R2	162
S.Chicago, Ill. R2	157
Tonawanda, N.Y. B12	157
Williamsport, Pa. S10	166

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55

Under-Size Body (rolled thread; not nutted):

½" x 6" and smaller	61

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

†½" x 4" and smaller and shorter are not nutted.

Lag Bolts

All diams. x 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-Up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED (nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
⅛" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.9¢
⅞-in. under. List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D.	B.W.	Seamless		Elec. Weld
In.	Gage	H.R.	C.D.	H.R.
1	13	....	21.06	20.41
1¼	13	....	24.94	20.44
1½	13	23.31	27.57	22.60
1⅝	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.59
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.54

RAILWAY MATERIALS

	Standard			Toe Rails
	No. 1	No. 2	All No. 2	60 lb Under
RAILS				
Bessemer, Pa. U5	4.725	4.625	4.675	5.65
Ensley, Ala. T2	4.725	4.625	....	5.65
Fairfield, Ala. T2	....	....	....	5.65
Gary, Ind. U5	4.725	....	....	....
Huntington, W.Va. W7	....	....	....	5.65
IndianaHarbor, Ind. I-2	4.725	4.625	4.675	....
Johnstown, Pa. B2	....	....	....	(16)5.65
Lackawanna, N.Y. B2	4.725	4.625	....	5.65
Minnequa, Colo. C10	4.725	4.625	....	6.15
Steelton, Pa. B2	4.725	4.625	....	....
Williamsport, Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield, Ala. T2	5.625
Gary, Ind. U5	5.625
Ind. Harbor, Ind. I-2	5.625
Lackawanna, N.Y. B2	5.625
Minnequa, Colo. C10	5.625
Seattle B3	5.775
Steelton, Pa. B2	5.625
Torrance, Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity, Mo. S5	12.40
Lebanon, Pa. B2	12.40
Minnequa, Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind. Harbor, Ind. S13	7.25
Johnstown, Pa. B2	7.25

JOINT BARS

Bessemer, Pa. U5	5.825
Fairfield, Ala. T2	5.825
Ind. Harbor, Ind. I-2	5.825
Joliet, Ill. U5	5.825
Lackawanna, N.Y. B2	5.825
Minnequa, Colo. C10	5.825
Steelton, Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.90
Ind. Harbor, Ind. I-2, Y1	7.90
KansasCity, Mo. S5	7.90
Lebanon, Pa. B2	7.90
Minnequa, Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago, Ill. R2	7.90
Struthers, O. Y1	7.90
Youngstown R2	7.90

METAL POWDER

(Per pound f.o.b shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed	*9.25*
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	*8.25*
Minus 20 mesh	9.00
Swedish, c.i.f. Camden, N. J., c.l. in bags	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. Shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	*34.00*
Unannealed (99+% Fe) (minus 325 mesh)	*57.00*
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	*61.25-64.50†*
Copper:	
Electrolytic	*56.75*
Reduced	*56.75*
Lead	*22.80*
Manganese:	
Minus 35 mesh	*64.00*
Minus 100 mesh	*70.00*
Minus 200 mesh	*75.00*
Nickel, unannealed	*$1.00*
Nickel-Silver, 5000-lb lots	*58.75-61.50†*
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	*47.50*
Solder	7.00*
Stainless Steel, 302	*99.00*
Stainless Steel, 316	*$1.32*
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡

Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.10c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c if S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower;
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(47) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P4	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa,deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$83.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62[a]	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.80	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.06	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.66
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[a]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[f]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; §§under ⅛-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [a]—500 to 9999 lb; [b]—400 to 999 lb; [c]—4000 lb and over; [d]—1000 to 1999 lb; [e]—1000 lb and over; [f]—1500 to 3999 lb; [g]—2000 to 3999 lb; [h]—f.o.b. local delivery in lots of 10,000 lb and over.

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

AMERICA'S FIRST IRON PLATE ROLLING MILL

Thirteen years after the War of 1812, Lukens Steel Company in Coatesville, Pennsylvania, was producing America's first rolled iron plates for boilers. Using tools and equipment that would seem exceedingly crude today, they rolled charcoal blooms into plates.

In 1825 the production of plates was limited to less than 34 inches width in this water-driven mill. Today, Lukens Steel Company has the country's largest plate mill, producing rolled plates up to 195 inches in width.

Another famous first in the iron and steel industry is BAKER'S MAGDOLITE, the original dead-burned dolomite. Ever since its beginning, BAKER'S MAGDOLITE has maintained a superior product. One that is always 5 ways better: Composition, Preparation, Strength, Economy and Quality. Order BAKER'S MAGDOLITE next time, and see for yourself how it delivers more uniform ingots, in greater numbers, and with less defective material.

5/55

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

BAKER'S MAGDOLITE

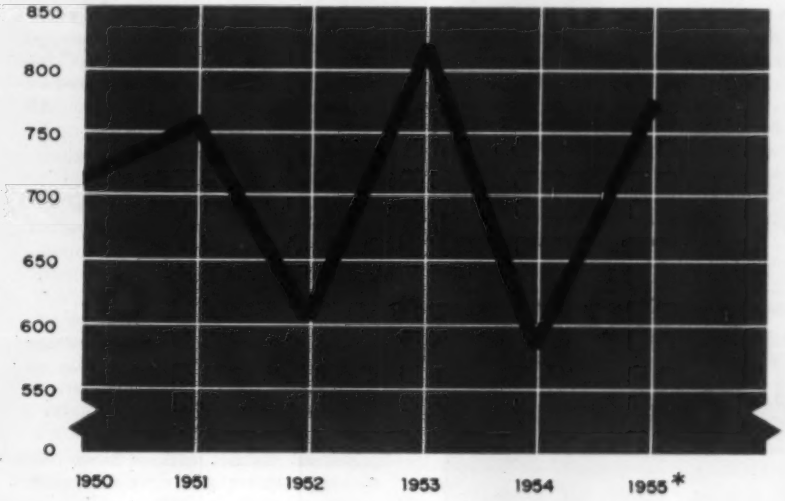
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

Silicon Steel: Nearing the Record

(Shipments in thousands of tons)



*Estimated
Source: American Iron & Steel Institute

Electrical Steel Surges

CONSUMPTION of electricity is expected to quadruple by 1975. That's good news to producers of silicon steel, because the two industries grow together. Wherever electricity is generated or used to run fractional horsepower motors, you'll find electrical steel, as it is sometimes called.

On the basis of figures for the first eight months of 1955, producers will ship about 780,000 tons of electrical steel this year, just short of the record (820,096 tons) in 1953 (see chart). Consumption probably will top 1953's, however, because that was the year of the great inventory buildup. This brisk business will probably continue into 1956, if bookings are any indication. Several producers that make this steel on an allotment basis already have opened the books for the first quarter of next year. All allotments have been snapped up.

Trends—There are four big developments in this industry. The one most talked about is the rapid rise of grain oriented silicon (STEEL, Oct. 11, 1954, p. 181). Introduced in 1937, today, this product accounts for about one-fourth of all silicon steel production. Only four of the eleven companies in this business produce grain oriented, and they are doing most of the expansion in this direction.

U. S. Steel Corp. is installing facilities at Vandergrift, Pa., for expected availability in 1956. Armco Steel Corp. is increasing its facilities at Butler, Pa. Crucible Steel Co. of America, most recent steel producer to get into the field, began shipments in September. Allegheny Ludlum Steel Corp. began operation of its new, 56-in., continuous, cold-rolling mill at Brackenridge, Pa., in September, 1954. While it rolls both stainless and electrical steel, electrical dominates the rolling schedule. The company is installing additional equipment and hopes to increase production of this steel before year end.

Feeling the Pressure—Another major producer of silicon sheet reports that its customers have been putting pressure on it to get into the production of grain oriented, but so far the company has not moved in that direction.

All the expansion has not been in grain oriented, however. Republic Steel Corp., which produces regular silicon steel, says it started with just one annealing furnace for electrical sheet in 1935. Now it has fourteen, with three more to be completed soon and another six in the planning stage. Most producers feel there is bound to be further expansion in the industry, because even now the electrical industry has outstripped the capacity of silicon steel producers to supply it.

Trend No. 2—Mill customers are showing more preference than ever for coiled stock, pushing handmill sheets farther in the background. Producers that have older equipment are converting to continuous mill operations or offering welded coils. Even though coils are more expensive, they are more economical to handle and fabricate.

Trend No. 3 — Normally, electrical steel undergoes several anneals in the mill and is sold with a guarantee of minimum core loss. There is a trend to stop the annealing process in the mill short of full anneal and selling the steel without the core loss guarantee for about $10 a ton under the normal price.

The fabricator stamps the fine grain metal and finishes the anneal himself. It is up to the fabricator to maintain close metallurgical control of the anneal, but if done properly, the finished product will have satisfactory magnetic qualities. The savings come from the cheaper mill price and longer die life.

Trend No. 4—Some mills report they are plating the core material with a varnish or similar protective coating. This serves two purposes: The coating acts as a lubricant for the dies, and it provides a better insulation than the oxide coating the steel normally develops during annealing. The cost of the coated steel is $12 to $18 a ton more than the uncoated, but increased die life and improved magnetic qualities of the core make up for it, producers claim.

The instability of the copper industry over the past year has caused great concern among customers, electrical steel producers say. In the long run, the steelmen think this situation will result in less copper and more—or higher grade— silicon steel in motors, generators and transformers.

New Markets—Although big power equipment is the biggest single user of silicon steel, there are many smaller uses which probably outweigh it when they are added up. Appliances have provided the big surge in the postwar years. Electronics is a real comer. Even though a single radio or television set does not use a large amount of electrical steel, the industry as a whole is becoming a big factor.

These new and smaller uses of silicon steel have changed the marketing patterns of the producers in the last 15 years. One producer states that in 1940, just two companies bought about 80 per cent of all silicon steel produced. They can account for only about 40 per cent

of the total market today.

Silicon steel producers are confident that their marketing pattern is not static. It will expand and shift with new uses and increased electrical consumption far into the future.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 191 & 192

Most of the sheet mills are entering new business for first quarter shipment. But they are not accepting all tonnage offered. With due allowances for arrearages, some makers won't have more than half their first quarter output available for new orders. This will be especially true of hot and cold-rolled sheets, and in lesser degree in galvanized and certain specialties, such as electrical sheets and enameling stock.

For what consolation it may afford buyers, the situation with most sheetmakers should be no worse in the first quarter than it is at present; it should be better than it was in the third quarter this year, during which time the mills were badly oversold, having booked heavy miscellaneous consumer business in anticipation of a summer slump in automotive requirements—which never developed.

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Inland Steel Co. started up its new No. 2 galvanizing line last week, to become the third largest producer of continuous galvanized steel in the country. Under construction for a year, the new line has a rated capacity of 6000 tons of continuous coated sheets a month and will raise the company's capacity for the product to about 20,000 tons monthly. All three lines were constructed under license from Armco Steel Corp.

Pressure for sheets is building up in the St. Louis area where several ingot conversion deals are reported.

Steel Bars . . .

Bar Prices, Page 190

Most sellers of hot-rolled carbon bars are entering new business on their books for the first quarter. As a general thing, bookings are on a month-to-month basis.

Sellers' district offices have been flooded with requests since first quarter books were opened. Little supply relief is expected in the early part of next year.

Sales of cold-finished bars are strong to a wide variety of consuming industries, with machine tool and auto builders' purchases ahead of those by miscellaneous users. Sellers of alloy bars will enter the first quarter on a more or less current delivery basis.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 190

Reinforcing bar producers in the Pacific Northwest are operating at approximate capacity. They hold fair order backlogs, though recent bookings have consisted mostly of small contracts, involving less than 100 tons each.

Tubular Goods . . .

Tubular Goods Prices, Page 194

The first quarter will see the continuance of current heavy demand for mechanical and pressure tubing. Pittsburgh district mills are booking first quarter orders on specialty tube products, with January rolling schedules practically filled. Oil country tubular goods are already sold out through the first quarter.

Some utilities and other users of seamless tubing are finding the product so difficult to obtain they are switching to buttweld when possible. Buttweld production is rising, deliveries are lengthening.

More extended deliveries on seamless and electricwelded pipe are stimulating forward buying in New England, notably by the utilities which

are placing part of their estimated 1956 requirements. First quarter schedules are well filled on 5 in. and larger sizes. Buttweld and electric-welded tubing shipments are still available in four to five weeks.

Wire . . .

Wire Prices, Pages 192 & 193

Three operating divisions of U. S. Steel Corp. (American Steel & Wire, Tennessee Coal & Iron and Columbia-Geneva) announced a revision in size extras for hot-rolled carbon steel wire rods 35/64-in. and smaller. These changes, effective Oct. 29, represent increases ranging from $1 to $4 a ton.

Manufacturers wire sales continue to exceed expectations. Tonnage is difficult to obtain for fourth quarter shipment. Orders are being taken for the first quarter.

Demand for merchant products is off seasonally, notably farm fence. Competition from foreign nails and fencing is reported increasing.

Warehouse . . .

Warehouse Prices, Page 195

Warehouse stocks average about half those held on Jan. 1. The tonnage would be lower if distributors were not exercising limitations on quantities shipped. Products in tightest supply are structurals, plates and sheets—in that order. Seasonal easing is developing in galvanized sheets.

Prospects for an improvement in steel supply during the first quarter are growing dim as steelmakers open order books for that period. A growing number of regular mill customers are trying to build their stocks by purchasing from warehouses. They are generally unsuccessful. Few warehouses have sufficiently well-balanced stocks to cover their needs.

Plates . .

Plate Prices, Page 190

Despite efforts to bring commitments into better balance, plate producers are still well oversold. Few, if any, believe they will be able to start off the new year on an even keel.

Mills that have opened books for first quarter orders have made allowances in one degree or another for arrearages that they are sure will have to be taken into account.

Demand is heavy for tankwork of all descriptions; also for construction and heavy equipment. Car requirements are being restricted because of lack of steel, plates in particular. Due to delays by the railroads, carbuilders were forced to come into the steel market this summer when demand elsewhere was already taxing producers' facilities to the limit. Builders of this equipment will get only a small portion of what they require this year, but they should fare better in the first and second quarters next year.

About 52,500 tons of steel, chiefly plates, will be required for the superaircraft carrier recently awarded to the New York Shipbuilding Corp., Camden, N. J. Requirements will include 1020 tons of aluminum and 1000 tons of weld metal. March delivery is being asked on initial steel requirements.

Freight car requirements continue to expand, with the Reading in the market for 1400 cars and the Pennsylvania inquiring for 4000 tons of steel for 200 piggyback cars to be built in its own shops at Altoona, Pa.

The Claymont, Del., plate producer has resumed operations on its larger mill following a long suspension for repairs.

Structural Shapes . . .

Structural Shape Prices, Page 190

Order backlogs of the leading structural fabricating shops continue to increase, now standing at eight to nine months in some instances. The

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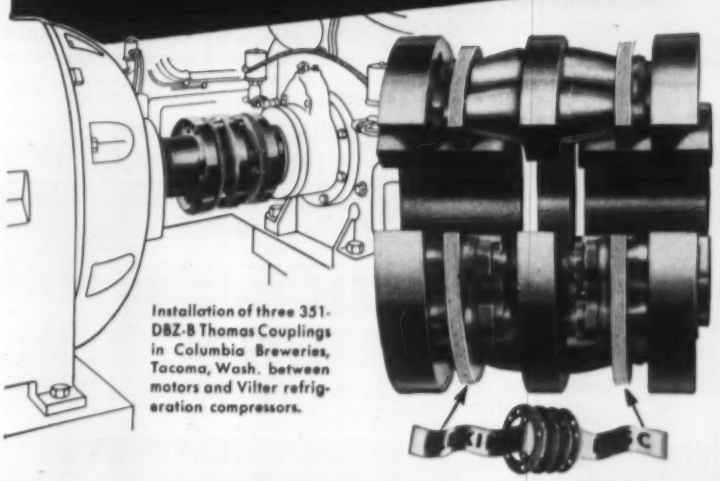
for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
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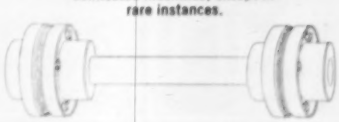

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Recently when we were manufacturing a large order of bronze worm gears, a very serious error was inadvertently made during the manufacturing process. In spite of constant vigilance, this was not discovered until the gears reached final inspection. The boys sure found it at that time. Actually the error amounted to the fact that the teeth had been cut about .010 too deep. While it might have been possible to make the mating worms oversize, this thought was the farthest from our minds. Because the worm gears were NOT correct, they were scrapped and replaced. The loss resulted in one of the largest single scrapped orders that we ever had. It hurt.

We believe that our ardent will to supply gears of only the highest quality pays off. Our customers have the assurance that when they receive gears from CINCINNATI GEAR, these have been through a rigid and thorough inspection and are ready for assembly. Our men understand that there is "no compromise with quality," and that is the policy under which they operate. We also believe this is the least costly for our customers because once they receive our gears, they know there will be no "hidden" costs during assembly.

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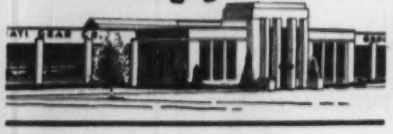

shortage of steel is restricting operations and is having some bearing on the backlog situation. But the major factor still is heavy construction demand. Seasonal influences are tending to retard business slightly, but there is still more work coming out than fabricators can promptly cope with.

Shape producers are beginning to accept tonnage for first quarter shipment. Carry-overs in some cases may be a little less than at the beginning of the current quarter, but, if so, it will be because of rejections of considerable new tonnage in recent weeks.

New England shops are hard pressed for plain material. A leading producer is shipping August tonnage. An eastern Pennsylvania supplier is overbooked, and no help is in sight from Pittsburgh mills.

Bids have been closed by the Consolidated Edison Co. of New York on 18,000 tons for two power house units. Each unit will require 9000 tons, with one definitely scheduled for erection in Astoria and the other for likely erection in Staten Island.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3200 tons, plant addition, General Electric Co., Louisville, to Ingalls Iron Works, Birmingham.

2000 tons, Aviation Trades high school, Queens, New York, for the Board of Education, through Caristo Contracting Co., Brooklyn, N. Y., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

1900 tons, 21-story apartment, 59th St. and Sutton Place, New York, to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, assembly shop, Bath Iron Works, Bath, Me., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

950 tons, Washington state Skagit county bridge (erected), to United Concrete Pipe Co., Auburn, Wash.; Neukirch Bros., Seattle, general contractor.

750 tons, coal preparation plant, Clinchfield Coal Corp., Dante, Va., through the Link-Belt Co. to Bristol Steel & Iron Works Inc., Bristol, Va.

600 tons, RCA factory building, Cambridge, O., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

475 tons, senior high school, Rosalyn, Long Island, N. Y., to Schacht Steel Construction Inc., New York.

450 tons, building, High Voltage Engineering Co., Burlington, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.

400 tons, Robert E. Speer library, Princeton University, Princeton, N. J., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

385 tons, Bailey junior high school, West Haven, Conn., to Connecticut Steel Co., New Haven; Fusco-Amatruda Co., New Haven, general contractor; 80 tons of reinforcing bars, Fox Steel Co., Orange, Conn.

375 tons, building, Traceriab Inc., Waltham, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Corp., Providence, R. I., general contractor.

340 tons, state bridge, Rockland county, N. Y., to Pine Brook Iron Works, Scranton, Pa.

250 tons, plant, Pennsylvania Power & Light Co., Harrisburg, Pa., to Reading Metalcraft Co., Reading, Pa.

250 tons, building, Lowell Industrial Development Commission, Lowell, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.

300 tons, crossline railroad bridges, Charlotte, N. C., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Blythe Bros. Co. Inc., Charlotte, general contractor; 90 tons

That 5 minute talk

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It's tough on the BTU Burglar, but the word is getting around just the same . . . that industrial furnaces *don't* have to be burgled for billions of BTU's—worth thousands of dollars—per year.

Typical example: A bolt manufacturer relined three furnaces with *lightweight* B&W Insulating Firebrick. Analysis of fuel cost per ton of steel reveals that the B&W linings save $6,532 per year, compared with the ordinary heavy firebrick linings in the plant's other furnaces.

Heavy furnace linings waste your fuel dollars two ways: They soak up and hold large quantities of heat which are lost when the furnace is cooled; and they conduct and lose too much heat through the walls. Lightweight insulating firebrick, containing millions of tiny air cells, heat up and cool quickly, absorbing and storing very little heat. Also, they resist heat flow, keeping it inside the furnace to do productive work.

If you want to save on fuel, your logical choice is the lightest weight refractory you can buy—*lightweight* B&W Insulating Firebrick.

Investigate now so that you can try B&W Insulating Firebrick next time you reline your furnace or kiln. Write today for complete facts or contact the B&W Refractories Engineer in your locality.

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of reinforcing bars, Easterby & Mumaw, Atlanta.

300 tons plus, Oregon state Yamhill county bridge, to unstated interest; Hamilton & Thomas, Eugene, Oreg., general contractor.

225 tons, warehouse and garage, New England Telephone & Telegraph Co., Brockton, Mass., to Groisser & Shinger Iron Works, Somerville, Mass.; Turner Construction Co., Boston, general contractor.

200 tons, pulp plant project, to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

18,000 tons, two power house units, Consolidated Edison Co. of New York, New York; bids closed Nov. 4.

545 tons, five beam bridges, state highway, Spaulding turnpike, Dover, N. H. 200 tons, bulk warehouse, Ladd Air Field, Alaska; bids to U. S. Engineer, postponed to Nov. 11.

220 tons, state bridge, Union county, Pa.; bids Nov. 18.

REINFORCING BARS . . .

REINFORCING BARS PLACED

500 tons, state bridge, Ocean county, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

115 tons, health center, Newton, Mass., to Northern Steel Inc., Medford, Mass.; S. & A. Allen Construction Co., Boston, general contractor; 50 tons of structurals to Groisser & Shinger Iron Works, Somerville, Mass.

110 tons, Washington state Skagit river bridge and 25 tons for a Washington state Whatcom county project, to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

380 tons, three state bridges, North Providence-Lincoln, R. I.

240 tons, five beam bridges, Spaulding turnpike, Dover, N. H.; also 120 tons of steel bearing piles.

236 tons, state bridge work, Cambria county, Pa., bids Nov. 18; project will also require 2567 tons of structural steel.

PLATES . . .

PLATES PLACED

300 tons, 3,950,000-gal standpipe, Wilmette, Ill., to Chicago Bridge & Iron Co., Chicago.

181 tons, H-piling, Idaho state Priest river bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; Kiewit-Daugherty, joint contractors.

PLATES PENDING

2600 tons, fuel storage tanks, including 25 vertical, bolted, knocked down, 10,000-bbl capacity, Bureau of Yards and Docks, Navy, Port Hueneme, Calif.; also 36 tanks, 4520 to 5434-gal capacity.

850 tons, eight 25,000-bbl fuel storage tanks, Elmendorf Air Base, Alaska; bids Nov. 15, U. S. Engineer, Anchorage, Alaska.

150 tons, 1-million-gal standpipe, District No. 75, Bellevue, Wash.; Pittsburgh-Des Moines Steel Co., Seattle, low at $59,480.

150 tons, 1-million-gal storage tank; Pittsburgh-Des Moines Steel Co., Seattle, low at $40,014 to Quincy, Wash.

130 tons, fuel storage tanks, Fairchild Air Base, Washington; bids Nov. 17 to the U. S. Engineer, Seattle.

PIPE . . .

CAST IRON PIPE PLACED

131 tons, various sizes, to Pacific States Cast Iron Pipe Co., Seattle, by Tacoma, Wash.

CAST IRON PIPE PENDING

100 tons, 1564 ft of 20-in., class 150; bids to Seattle, Nov. 4.

RAILS, CARS . . .

RAILROAD CARS PLACED

Alaska railroad, 50 seventy-ton flatcars, to the Warren Car Co., Warren, Pa.

Nickel Plate, 100 flatcars, to its Ironton, O. shops.

Pennsylvania, 200 piggyback cars, to its Altoona, Pa. shops.

St. Louis-Southwestern, 700 fifty-ton boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Reading, 500 seventy-ton gondolas, 500 seventy-ton hoppers and 400 boxcars.

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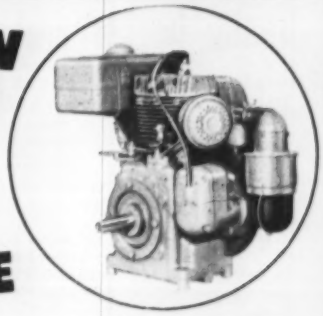

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MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $90.50; 19-21% Mn, 1-3% Si, $88; 16-19% Mn, $86.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03 max 38c, 0.06 max 36.50c, 0.1 max 36c, 0.15 max 35.75c, 0.2 max 35.50c, 0.5 max 35.25c, 1.0 max 34c, 1.5 max 33.85c, 2.0 max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contact, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets 13.5c; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2¼ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed ½" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

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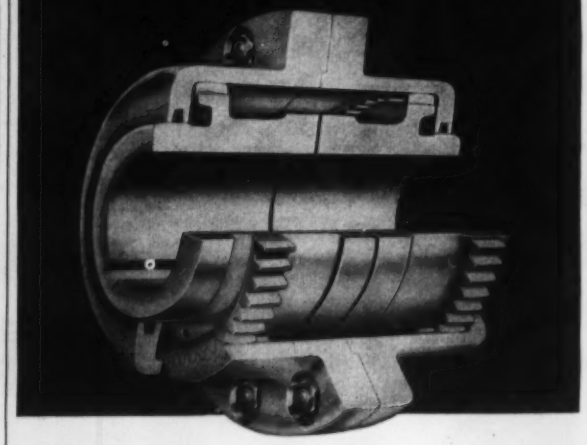

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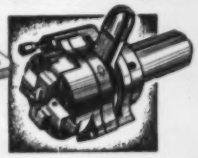

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Ores

Lake Superior Iron Ore
(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore
Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore
Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore
Net ton unit, before duty

Foreign, wolframite, good commercial quality	$34.50-$35.00
Domestic, scheelite, mine	63.00

Manganese Ore
Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore
Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	32.00

Domestic
Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore
Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore
Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)
High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Parber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.
Super-Duty: St. Louis, $150.

Silica Brick (per 1000)
Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.
Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)
Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)
2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)
Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)
50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, $201.
60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244; Philadelphia, $248.
70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)
Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)
Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)
Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)
Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)
Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton
Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point
Phenol: Grade 1, 14.00; Grade 2-3, 13.50; Grade 4, 13.50; Grade 5, 14.25.

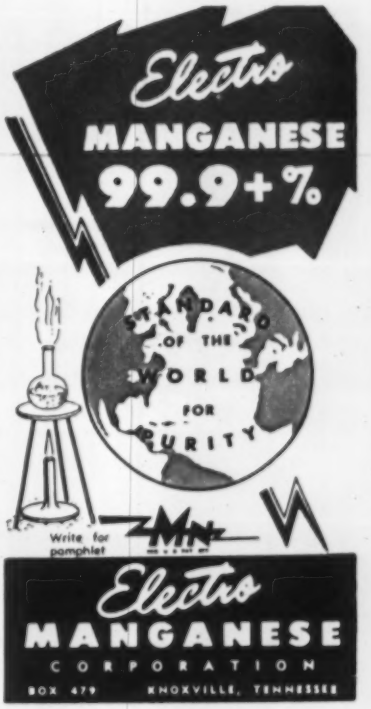
Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Inches Diam	Length	Per 100 lb
GRAPHITE		
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5¼	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
CARBON		
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10 05
30	84	10 20
40, 35	110	9.90
40	100	9.90



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Scrap . . .

Scrap Prices, Page 208

Chicago—The scrap market in this district continues to lag in volume, but there has been clarification in prices. A larger consumer, which normally states its future buying policy at month end, placed orders for No. 1 industrial bundles at $47, No. 1 industrial heavy melting steel at $46 and No. 2 bundles at $34. The effect of this was to firm up No. 1 heavy melting by $1 a ton to a level which prevailed up to two weeks ago and to reaffirm current prices on the bundle grades.

Buffalo — Prices on steelmaking grades of scrap jumped $1 a ton for No. 2 material and $4 a ton for No. 1 quality on sales to one of the area's leading mills. Business also was reported in blast furnace grades at advances of $1 a ton.

Cleveland—Prices on steelmaking grades of scrap are unchanged here despite the absence of substantial sales in the area. The market is being supported by activity in the Valley. Reported sales there last week: No. 1 heavy melting at $48.50 and electric furnace scrap at $49. The foundry grades of scrap are firm. A recent purchase by a leading automotive foundry of low phos material boosted the price on that grade to a range of $50-$51.

Pittsburgh—Small amounts of No. 1 heavy melting scrap were sold to a local producer at prevailing prices last week. It was practically the only action in major scrap grades. Scrap is moving slowly here in contrast to neighboring areas, brokers say, but the market is considered strong. Rail prices moved up about $3 a ton on latest lists. Stainless steel scrap grades are also showing greater strength.

Cincinnati — Some new buying by district mills is expected shortly. The tone of the market is firm. The only price changes last week resulted in advances on cast iron borings and mixed borings and turnings to a range of $24.75-$25.75.

Boston—The spread in brokers' buying prices for No. 1 heavy melting steel is $39 shipping point for district mill consumers and $27.50 for eastern Pennsylvania. Shipments against orders for eastern Pennsylvania are substantial, the bulk of bundles in both grades going to that area. Cast grades are up an average of $1 on slightly heavier movement.

New York—Except for an advance of $1 on No. 1 cupola to $37-$38, brokers' buying prices are unchanged. Buying prices in most cases appear high enough to bring out a steady flow of tonnage.

Philadelphia—While there is an underlying note of strength in the steel scrap market, prices are sufficiently high in most cases to bring out a steady flow of tonnage. No. 2 heavy melting is a shade higher at $41, delivered, and couplers, springs and wheels have advanced to a flat $52, delivered. Otherwise, the steel grades are unchanged.

Detroit—Prices on blast furnace grades of scrap appear to be weak, with machine shop turnings quoted at $22; mixed borings and turnings, $22; and short shovel turnings, $24. Demand for electric furnace and foundry scrap is strong—prices are up about $2 on the latest automotive lists.

Los Angeles—Increasing exports of scrap to Japan from West Coast ports are causing a shortage in the No. 1 grades. Japan has been taking heavy tonnage for several weeks.

Birmingham—The scrap market continues strong with specialty items advancing. Blast furnace, open-hearth and cast grades are steady.

San Francisco—No. 1 cupola cast price has been advanced $2 to $3 a ton.

Seattle—Competition for scrap has forced some relaxation in specifications. Almost any quality material is salable. Buyers are accepting scrap they rejected a few months ago. Mill inventories are only fair; export demand is reported increasing.

Japan is said to be paying above $60 a ton.

Pig Iron . . .

Pig Iron Prices, Page 195

Merchant pig iron business is holding up well, with bookings this fall the heaviest for the year. Seasonal factors probably will have a depressing effect on the market over the remainder of the year.

(*Please turn to page* 210)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 2	$45.17
Oct. 26	45.00
Oct. Avg.	45.17
Nov. 1954	33.33
Nov. 1950	41.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	44.00-45.00
No. 2 bundles	37.00-38.00
No. 1 busheling	44.00-45.00
Machine shop turnings	*29.00-30.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	39.00-40.00
Heavy breakable cast	39.00-40.00
Unstripped motor blocks	29.00-30.00
No. 1 machinery cast	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
Rails, 2 ft and under	*58.00-59.00*
Rails, 18 in. and under	*59.00-60.00*
Rails, random lengths	*55.00-56.00*
Railroad specialties	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	270.00-285.00
18-8 turnings	130.00-140.00
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.50-28.50
Short shovel turnings	27.50-28.50
Cast iron borings	27.50-28.50
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	*50.00-51.00*
Alloy free, short shovel turings	31.00-32.00
Electric furnace bundles	*45.50-46.50*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	58.00-59.00
Cast steel	48.00-49.00
Railroad specialties	54.00-55.00
Uncut tires	49.00-50.00
Angles, splice bars	54.50-55.50
Rails, rerolling	63.00-64.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	290.00-300.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	47.50-48.50
No. 2 heavy melting	35.00-36.00
No. 1 bundles	47.50-48.50
No. 2 bundles	32.00-33.00
No. 1 busheling	47.50-48.50
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	47.50-48.50
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CHICAGO

No. 1 heavy melting	*43.00-46.00*
No. 2 heavy melting	34.00-35.00
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles	43.00-44.00
No. 2 bundles	33.00-34.00
No. 1 busheling	*43.00-46.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*47.00-48.00*
Punchings & plate scrap	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	37.00-38.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	*50.00-51.00*
Drop broken machinery	*50.00-51.00*

Railroad Scrap

No. 1 R.R. heavy melt	47.00-48.00
R.R. malleable	56.00-57.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	57.00-58.00
Rails, rerolling	65.00-66.00

Stainless Steel Scrap

18-8 bundles & solids	*305.00-315.00*
18-8 turnings	*205.00-215.00*
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	40.00
No. 2 heavy melting	30.00
No. 1 bundles	40.00
No. 2 bundles	29.00
No. 1 busheling	40.00
Machine shop turnings	*22.00*
Mixed borings, turnings	*22.00*
Short shovel turnings	*24.00*
Punchings & plate scrap	*48.00*

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	44.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Cast iron borings	17.00-18.00
Short shovel turnings	*28.00-29.00*
Machine shop turnings	*27.00-28.00*
Electric furnace bundles	*43.00-44.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*47.00-48.00*
Structural plate, 2 ft	*46.00-47.00*
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18-in. and under	*58.50-59.50*
Rails, rerolling	*58.00-59.00*
Rails, random lengths	*53.00-54.00*
Angles, splice bars	*55.00-56.00*

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	*41.00*
No. 1 bundles	46.00-47.00
No. 2 bundles	37.00-38.00
No. 1 busheling	46.00-47.00
Electric furnace bundles	48.50
Machine shop turnings	28.50-29.50
Mixed borings, turnings	28.50-29.50
Short shovel turnings	30.50-31.50
Structurals & plate	49.00-50.00
Heavy turnings	43.00
Couplers, springs, wheels	*52.00*
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Malleable	*46.00-46.50*
Heavy breakable cast	45.00-46.00
Drop broken machinery	47.00-48.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	41.00-42.00
No. 2 bundles	32.00-33.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	22.00-23.00
Low phos. (structural & plate)	42.00-43.00

Cast Iron Grades

No. 1 cupola	*37.00-38.00*
Unstripped motor blocks	25.00-26.00
Heavy breakable	38.00-39.00

Stainless Steel

18-8 sheets, clips, solids	290.00-300.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.50-39.00*
No. 2 heavy melting	*30.00-30.50*
No. 1 bundles	*37.50-38.00*
No. 2 bundles	*28.00-28.50*
Machine shop turnings	20.00-20.50
Mixed borings, turnings	22.50-23.00
Short shovel turnings	23.50-24.00
No. 1 cast	*31.00-32.00*
Mixed cupola cast	*29.00-30.00*
No. 1 machinery cast	*36.00-37.00*

BUFFALO

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	32.00-33.00
No. 1 busheling	*43.00-44.00*
Mixed borings, turnings	*29.00-30.00*
Machine shop turnings	*27.00-28.00*
Short shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Low phos.	*47.00-48.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 2 ft and under	51.00-52.00
Railroad specialties	48.00-49.00

CINCINNATI

Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.50-42.50
No. 2 heavy melting	36.00-37.00
No. 1 bundles	41.50-42.50
No. 2 bundles	33.00-34.00
No. 1 busheling	41.50-42.50
Machine shop turnings	27.00-28.00
Mixed borings, turnings	*24.75-25.75*
Short shovel turnings	30.00-31.00
Cast iron borings	*24.75-25.75*
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	36.00
No. 1 bundles	39.50
No. 2 bundles	31.50
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	46.50
Charging box cast	39.00
Heavy breakable cast	37.00
Unstripped motor blocks	37.00
Brake shoes	36.00
Clean auto cast	47.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00
Rails, 18 in. and under	59.00
Rails, random lengths	56.00
Rails, rerolling	64.00
Angles, splice bars	55.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	39.50
No. 2 bundles	34.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	50.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	29.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	35.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	35.00
Machine shop turnings	12.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Short shovel turnings	20.00
Cast iron borings	18.00
Cut structurals	41.00
Heavy turnings	20.00
Punchings & plate scrap	39.00

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

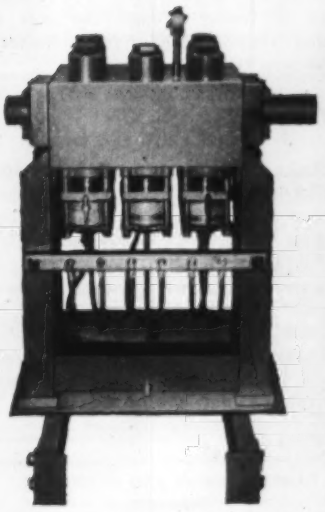
(Delivered prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory:	
Prepared	36.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



LOGEMANN HYDRAULIC OPERATING VALVE

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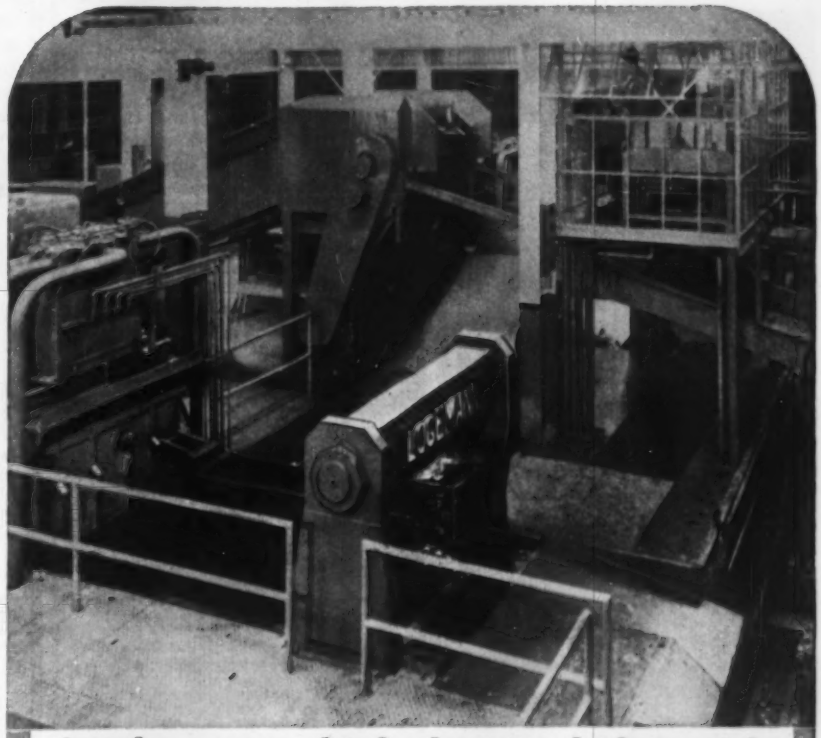

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The illustration shows one of two large scrap-press units in a modern automotive plant. Over a period of many years, such units have baled sheet scrap skeletons and trim from metal operations in large industrial plants throughout the country, forming the scrap into high-density bales for re-melting in steel mills. Low baling costs are the result of correct design for heavy duty service, minimum maintenance and operating interruptions, as well as simplicity, accessibility and safety features.

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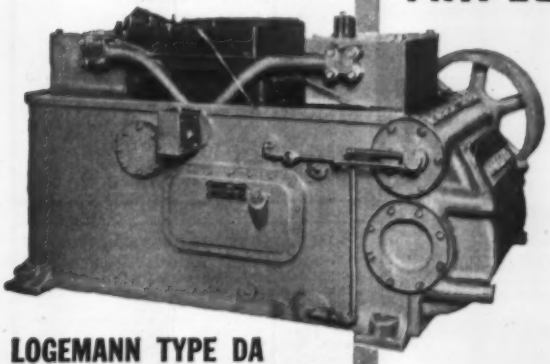

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(*Concluded from page* 207)

Foundries are holding operations at a high level, averaging about 85 per cent of capacity. Their inventories are not large, and they encounter continued strength in the scrap market, which tends to support their buying interest in pig iron.

Inland Steel Co. ended an eight-year campaign for its Madeline "A" blast furnace at Indiana Harbor on Nov. 1 when it blew out the unit for relining. About 3.2 million tons of iron were produced since the stack was blown in Aug. 1, 1947—a new record for Inland blast furnaces. Its rated capacity is 390,650 tons of pig iron a year. Relining will take about two months.

Kaiser Steel Corp. will ship 110,000 gross tons of pig iron to Japan, starting in late November and continuing through 1956. Shipments will be made through the port of Long Beach (Calif.) from Kaiser's Fontana (Calif.) plant.

Iron Ore . . .

Iron Ore Prices, Page 205

Lake iron ore shipments totaled 2,719,011 gross tons in the week ended Oct. 31, reports the Lake Superior Iron Ore Association. This compares with 1,516,657 tons shipped in the corresponding week a year ago. Cumulative shipments to Oct. 31 in the 1955 shipping season are 79,610,132 tons. Movement to the same date in the 1954 season was only 57,736,665 tons.

CLASSIFIED

Help Wanted

TITANIUM METALLURGIST. Either experienced man or one interested in entering this field covering titanium production in mill converting to bars, forgings, sheet, strip and wire. Work will include both the technical and production aspects of material. Send information giving education, experience, age references, etc. Reply Box 330, STEEL, Penton Building, Cleveland 13, Ohio.

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Steel Foundry in East desires services of graduate metallurgist with some experience in acid and basic melting procedures and sand control. Please give full particulars regarding background and salary desired in first letter. Reply Box 334, STEEL Penton Bldg., Cleveland 13, Ohio.

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Advertising Index

Acme Chain Corporation 5
Acme Steel Products Division, Acme Steel Co. 44, 45
Alan Wood Steel Co. 161
Allegheny Ludlum Steel Corporation 37
Allen Manufacturing Co. 106
Allied Chemical & Dye Corporation, General Chemical Division 157
Allis-Chalmers 14, 15
Allis-Chalmers, Buda Division 169
Aluminum Company of America 213
American Brass Co., The, Buffalo Division 172
American Chain & Cable 67
American Chemical Paint Co. 164
American Nickeloid Co. 123
American Steel & Wire Division, United States Steel Corporation 47
American Welding & Mfg. Co., The 40
American Zinc, Lead & Smelting Co. 187
American Zinc Sales Co. 187
Anaconda Wire & Cable Co. 142, 143
Arcos Corporation 178, 179
Armstrong-Blum Mfg. Co. 83
Atlantic Refining Co., The 51

Babcock & Wilcox Co., The, Refractories Division 200
Bakelite Co., A Division of Union Carbide & Carbon Corporation 61
Baker, J. E., Co., The 196
Baldwin-Lima-Hamilton Corporation, Eddystone Division 7
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 214
Bixby, R. W., Inc. 210
Blanchard Machine Co., The 30
Bliss & Laughlin, Inc. 22
Bliss, E. W., Co. 43
Brad Foote Gear Works, Inc. 168
Browning, Victor R., & Co., Inc. 204
Buda Division, Allis-Chalmers 169
Bullard Co., The 34
Buschman, E. W., Co., The 126

Carborundum Co., The 77, 78
Carlson, G. O., Inc. 35
Carpenter Steel Co., The 32
Carpenter Steel Co., The, Alloy Tube Division 50
Century Electric Co. 177
Chemsteel Construction Co., Inc. 210
Cincinnati Gear Co., The 200
Cincinnati Milling Machine Co., The, Process Machinery Division 95
Cleveland Crane & Engineering Co., The 146
Cleveland Metal Abrasive Co., The 185
Cleveland Punch & Shear Works Co., The 68
Climax Molybdenum Co. 72
Colorado Fuel & Iron Corporation, The 127
Columbia-Geneva Steel Division, United States Steel Corporation 47
Cone Automatic Machine Co., Inc. 11
Continental Industrial Engineers, Inc. 173
Continental Steel Corporation 149
Cowles Chemical Co. 198
Cowles Tool Co. 202
Cross Co., The 111
Crown Cork & Seal Co., Inc. 27
Crucible Steel Casting Co. 204
Crucible Steel Company of America 63
Cullen-Friestedt Co. 207

Detrex Corporation 128
Du Pont, E. I., de Nemours & Co., Inc. 13
Duraloy Co., The 170

Eastern Machine Screw Corporation, The 176, 204, 211
Eddystone Division, Baldwin-Lima-Hamilton Corporation 7
Electric Equipment Co. 211
Electric Service Co., The 211
Electro Manganese Corporation 205
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corporation 64
Equipment Corporation of America 211
Erie Foundry Co. 55

Eureka Fire Brick Works 210
Exide Industrial Division, The Electric Storage Battery Co. 57

Farrel-Birmingham Co., Inc. 36
Fischer Special Mfg. Co. 189
Follansbee Steel Corporation 182
Freeway Washer & Stamping Co. 202

Garlock Packing Co., The 148
General Chemical Division, Allied Chemical & Dye Corporation 157
Georgia Department of Commerce 150
Gisholt Machine Co. 79
Great Lakes Steel Corporation 100

Handy & Harman 118
Hannifin Corporation 176
Hansen Manufacturing Co., The 174
Haynes Stellite Co., A Division of Union Carbide & Carbon Corporation 42
Heald Machine Co., The ..... Inside Front Cover
Hetz Industries 211
Hevi Duty Electric Co. 162

Industrial Brownhoist Corporation 96
Industrial Products Suppliers 202
Inland Steel Co. 86
International Nickel Co., Inc., The 84
Ironsides Co., The 49

Johnson Bronze Co. 69
Jones & Lamson Machine Co., Machine Tool Division 8, 9
Jones & Laughlin Steel Corporation 141

Kaiser Steel Corporation 211
Kearney & Trecker Corporation 113
Kewanee-Ross Corporation 62
Keystone Steel & Wire Co. 180
Koppers Co., Inc., Engineering & Construction Division 58, 59

Laclede-Christy Co. Division of H. K. Porter Company, Inc. 10
Lake Erie Engineering Corporation 28, 29
Lavallee & Ide, Inc. 107
Lewthwaite, T. H., Machine Co., Inc. 202
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation 31, 70
Lithium Corporation of America, Inc. 166
Logemann Brothers Co. 209
Luria Brothers & Co., Inc. 206

McKee, Arthur G., & Co. 211

Magnaflux Corporation 119
Malleable Founders' Society 156
Mannesmann-Meer Engineering & Construction Co., Inc. 171
Marchant, Geo. F., Co. 212
Markem Machine Co. 16
Master Electric Co., The ..... Inside Back Cover
Meehanite Metal Corporation 116, 117
Mesta Machine Co. 139
Metal Blast, Inc. 60
Metallizing Engineering Co., Inc. 115
Midvale Co., The 4
Minnesota Mining & Mfg. Co. 17, 18, 19, 20
Monsanto Chemical Co., Organic Chemicals Division 2
Mueller Brass Co. 56

Naresco Equipment Corporation 155
National Malleable & Steel Castings Co. 120
National Steel Corporation 100
National Tube Division, United States Steel Corporation 47
New Jersey Zinc Co., The 103
Niagara Machine & Tool Works 24, 25

Ohio Ferro-Alloys Corporation 54
Osborn Manufacturing Co., The 3
Ottawa Steel Products, Inc. 205

Permacel Tape Corporation 46
Pittsburgh Lectromelt Furnace Corporation 66
Pittsburgh Steel Co., Thomas Strip Division 163
Poole Foundry & Machine Co. 204
Porter, H. K., Company, Inc., Laclede-Christy Co. Division 10
Potter & Johnston Co., Subsidiary of Pratt & Whitney Co., Inc. 114
Price Engineering Co., Inc. 168

Remington Rand Division of Sperry Rand Corporation 121
Republic Steel Corporation 152, 153
Revere Copper & Brass, Inc. 137
Rockford Machine Tool Co. 124, 125
Rollway Bearing Co., Inc. 65
Ruby Chemical Co. 207
Russell, Burdsall & Ward Bolt & Nut Co. 104
Ryerson, Joseph T., & Son, Inc. 80

Sealmaster Bearings, A Division of Stephens-Adamson Mfg. Co. 71
Shell Oil Co. 52, 53
Shenango-Penn Mold Co., Centrifugal Castings Division 154
Silent Hoist & Crane Co. 201
Simonds Saw & Steel Co. 74
Sperry Rand Corporation, Remington Rand Division 121
Square D Co. 33
Stephens-Adamson Mfg. Co., Sealmaster Bearings Division 71
Sterling Wheelbarrow Co. 212
Sun Oil Co., Industrial Products Department 108
Superior Steel Corporation 145
Surface Combustion Corporation 122

Tennessee Coal & Iron Division, United States Steel Corporation 47
Thomas Flexible Coupling Co. 199
Thomas Strip Division, Pittsburgh Steel Co. 163
Timken Roller Bearing Co., The ..... Back Cover
Tube Methods, Inc. 6
Twin Disc Clutch Co. 12

Union Carbide & Carbon Corporation, Bakelite Co. 61
Union Carbide & Carbon Corporation, Electro Metallurgical Co. 64
Union Carbide & Carbon Corporation, Haynes Stellite Co. 42
Union Carbide & Carbon Corporation, Linde Air Products Co. 31, 70
Unit Crane & Shovel Corporation 165
United Engineering & Foundry Co. 181
United States Rubber Co., Mechanical Goods Division 75
United States Steel Corporation, Subsidiaries 47
United States Steel Export Co. 47
United States Steel Supply Division, United States Steel Corporation 47
Universal-Cyclops Steel Corporation 210

Vickers Electric Division, Vickers, Inc. 23

Ward Steel Co. 210
Wean Equipment Corporation 38, 39
Westinghouse Electric Corporation 26, 41, 76
Wheeler, C. H., Manufacturing Co. 210
Wheland Co., The 48
Wickwire Spencer Steel Division, The Colorado Fuel & Iron Corporation 127
Wisconsin Motor Corporation 201
Worcester Stamped Metal Co. 204

Yale & Towne Manufacturing Co., The 73
Yoder Co., The 21

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Pages 210, 211

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company _____
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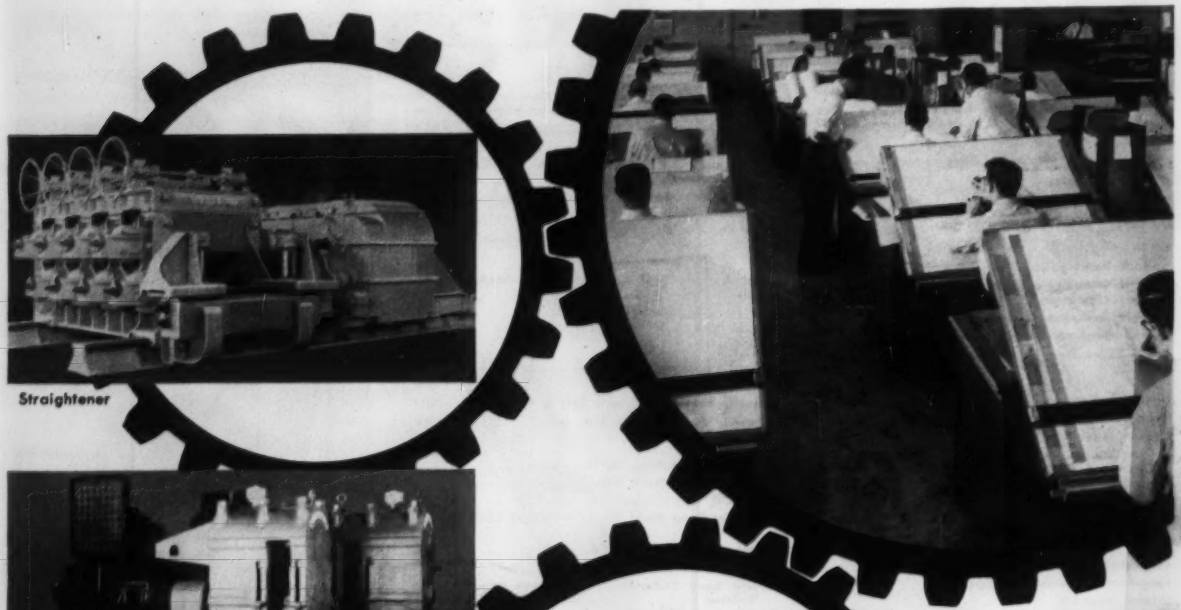

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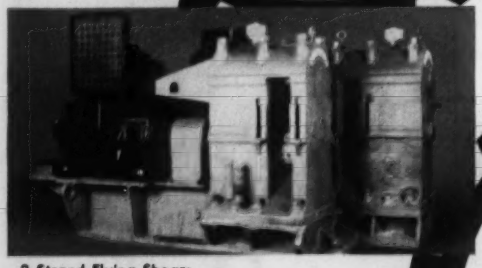
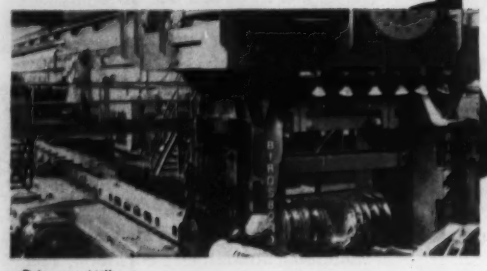


2-Strand Flying Shears

18" Roughing Mill



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MM-46-55

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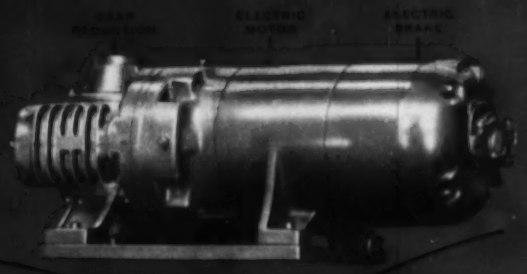

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standard units easily combine into special purpose drives

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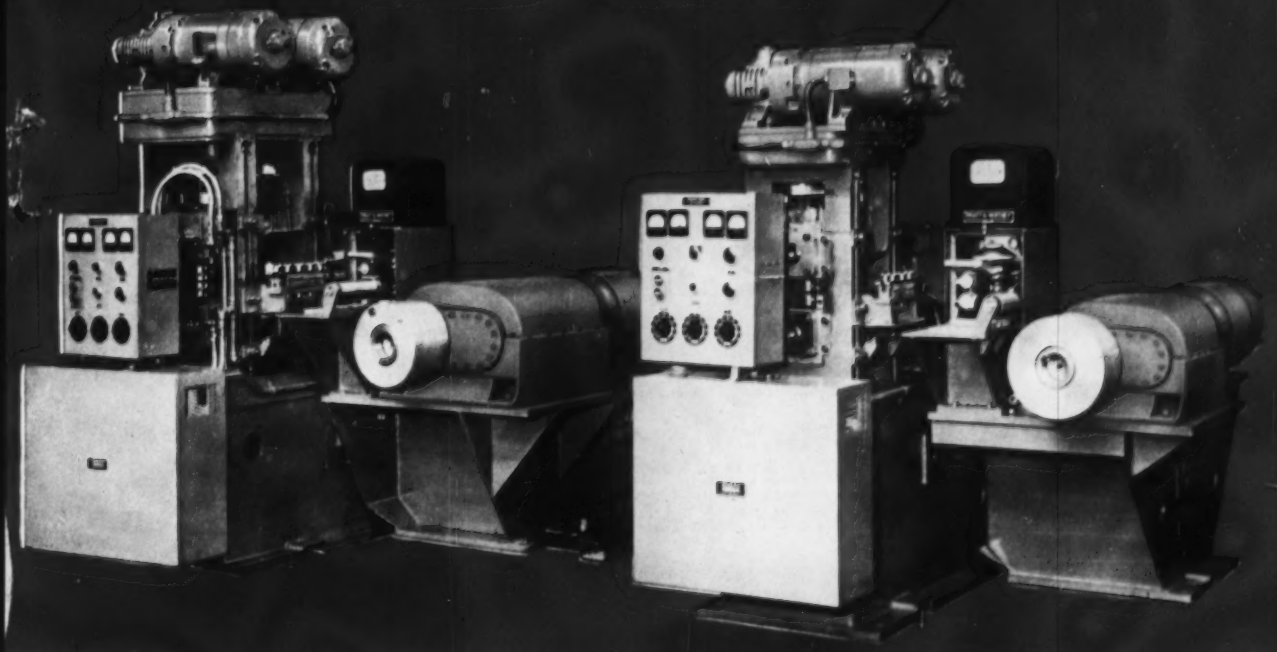

How TIMKEN® bearings cut maintenance, simplify lubrication for Steel Company of Wales

THE rolls of this 45″x115″ blooming and slabbing mill, in operation at the Steel Company of Wales, England, were mounted on Timken® tapered roller bearings by the builder, United Engineering and Foundry Company, to handle the heavy loads with minimum maintenance.

The lubrication system necessary is simple, and quick release couplings attached to the grease supply pipes enable roll change time to be reduced to a minimum. Also, there's less lubricant leakage during operation because Timken bearings hold roll necks and housings concentric, making closures more effective.

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This symbol on a product means its bearings are the best.

UNITED ENGINEERING AND FOUNDRY COMPANY mounted the rolls of this Steel Company of Wales blooming and slabbing mill on Timken tapered roller bearings. Typical Timken bearing roll neck application is shown in cutaway.

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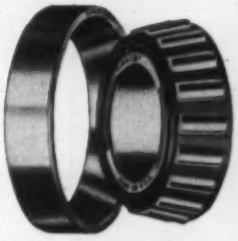

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